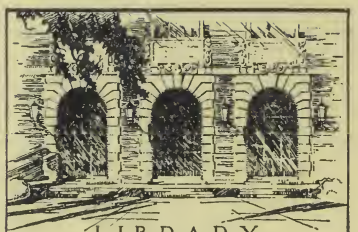

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VOL. VI—HORTENSE—LIBEL

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Lewis, William James, M.A.

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VOLUME VI.

HORTENSE, queen of Holland, is familiarly known as La Reine Hortense. Her proper name was Eugénie Hortense de Beauharnais, and she was the only daughter of Alexandre de Beauharnais and Josephine Tascher de la Pagerie. She was born on April 10, 1783. When four years old she accompanied her mother to Martinique, and returned with her three years later to be subjected to all the dangers of the Revolution. For a time she was sent with her brother to England, but soon returned. The marriage of her mother to Napoleon Bonaparte naturally altered her prospects altogether, and, as she grew to woman's estate, several marriages of more or less importance were proposed for her. It suited the first consul, however, that she should marry his brother Louis, and despite her tears and entreaties the marriage was concluded. In one of his moments of brutal frankness Napoleon confessed that his brother as a husband was "insupportable," though he characteristically proceeded to charge Hortense with having been the cause of her own misfortunes in not agreeing with her husband. Louis, it appears, was sincerely anxious to please his young wife. But his health was bad and his temper gloomy, while Hortense was exceptionally lively and fond of gayety. The natural consequence was an infinity of scandal, some of it of a very grave character. The recent publication of Madame de Rémusat's memoirs has, however, gone far to exonerate Hortense. The writer, equally outspoken and well informed, gives instances of the most fantastic and disgusting exercise of conjugal tyranny on Louis' part, and denies that his wife in any way misconducted herself, the malignant jealousy of the Bonaparte sisters being credited with the accusation. Within seven years of her marriage Hortense had three children, whose nomenclature, unless carefully studied, is somewhat puzzling. The eldest, Napoleon-Louis-Charles, was born in 1802 and died in 1807. The next, Napoleon-Louis, was born in 1804 and died in 1831. The third, Charles-Louis-Napoleon, was born in 1807, and lived to be the late emperor Napoleon III. When Napoleon distributed crowns to his relations Hortense was very anxious that her husband should receive that of Italy. Holland, however, fell to his share, and the ill-matched pair retired thither. The death of her eldest son made Holland intolerable to Hortense, and before long she returned to Paris and established herself in the Rue Cerutti. Nor did she from that time forward ever live in any regular fashion with her husband, whose forced abdication of his crown soon followed. In Paris she was more popular than respected, and her leisure time was filled up with many quasi-literary and artistic employments. It was there that she signalized herself by composing among other airs the famous melody of *Partant pour la Syrie*. The ineffable silliness of the words of this song is not due to her, but to a certain M. de Laborde; and it is only fair to say that it took Frenchmen twenty years to find out that the air was ugly, and that it was possibly stolen. Hortense continued even after her mother's divorce to exercise a certain influence over her stepfather. At the first Restoration she was confirmed in her title and possessions as Duchesse de Saint-Leu. But she ardently welcomed the returning emperor, and thenceforward France was hardly a residence for her, while her private life was disturbed by constant and indecent bickerings with her husband about the custody of her children. She bought a house at Arenenberg on the Lake of Constance and another at Augsburg, for the sake of educating her sons, and from time to time she undertook various journeys in the hope of furthering their interests. The Revolution of July gave her some chance of returning to France, but immediately afterward grave misfortunes overtook her. Her sons took part in the Italian risings, and the elder died of measles. Scarcely had she recovered from this when the Strasburg attempt was made against her advice. She lived long enough to see the future emperor return from America, and died at Arenenberg on October 3, 1837. Generally speaking, Hortense appears to have been an amiable woman, whose life was spoilt by the tyrannical egotism of her stepfather. She seems, however, to have been unduly given to intrigue; and she herself admitted that she might have lived on better terms with her husband, upon whom she was forced almost as much as he was forced on her.

HORTENSIUS, Quintus, was one of the first and most famous orators at the Roman bar in the latter days of the republic, when the orator's art was particularly flourishing and was diligently cultivated. Hortensius, like other eminent Roman citizens, passed through the regular succession of public offices, rising from the quæstorship in 81 to the consulship in 69 B.C. In 50 B.C., the last year of his life, he defended successfully one Appius Claudius against Dolabella, Cicero's son-in-law, who prosecuted the man on a serious charge of bribery.

HORTICULTURE embraces both the art and the science of the cultivation of garden plants, whether for utilitarian or for decorative purposes. Horticulture, apart from the mechanical details connected with the maintenance of a garden and its appurtenances, may be considered as the application of the principles of vegetable physiology to the cultivation of plants.

We propose here to notice briefly the several parts of a flowering plant, and to point out the rationale of the cultural procedures connected with them.

The Root.—The root, though not precluded from access of air, is not directly dependent for its growth on the agency of light. The efficiency of drainage, digging, hoeing, and like operations is accounted for by the manner in which they promote aëration of the soil, raise its temperature, and remove its stagnant or superfluous moisture. Owing to their growth in length at, or rather in the immediate vicinity of, their tips, roots are enabled to traverse long distances by surrounding some obstacles, penetrating others, and insinuating themselves into narrow crevices. As they have no power of absorbing solid materials, their food must be of a liquid or gaseous character. It is taken up from the interstices between the particles of soil exclusively by the finest subdivisions of the fibrils, and in many cases by the extremely delicate thread-like cells which project from them, and which are known as root-hairs. The number and density of these latter are in direct proportion to the abundance and suitability of the food of the plant. The importance of the root-fibers, or "feeding roots," justifies the care which is taken by every good gardener to secure their fullest development, and to prevent as far as possible any injury to them in digging, potting, and transplanting, such operations being therefore least prejudicial at seasons when the plant is in a state of comparative rest.

Root-Pruning and Lifting.—In apparent disregard of the general rule enunciated is the practice of root-pruning fruit trees, when, from the formation of wood being more active than that of fruit, they bear badly. The contrariety is more apparent than real, as the operation consists in the removal of the coarser root, a process which results in the development of a leash of fine feeding roots. Moreover, there is a generally recognized quasi-antagonism between the vegetative and reproductive processes, so that, other things being equal, anything that checks the one helps forward the other.

Watering.—So far as practical gardening is concerned, feeding by the roots after they have been placed in suitable soil is confined principally to the administration of water, and, under certain circumstances, of liquid manure; and no operations demand more judicious management. The amount of water required, and the times when it should be applied, vary greatly according to the kind of plant and the object for which it is grown, the season, the supply of heat and light, and numerous other conditions, the influence of which is to be learned by experience only. The same may be said with respect to the application of manures. The watering of pot-plants requires especial care. Water should as a rule be used at a temperature not lower than that of the surrounding atmosphere, and preferably after exposure for some time to the air.

Bottom-Heat.—The "optimum" temperature, or that best suited to promote the general activity of roots, and, indeed, of all vegetable organs, necessarily varies very much with the nature of the plant, and the circumstances in which it is placed, and is ascertained by practical experience. Artificial heat applied to the roots, called by gardeners "bottom-heat," is supplied by fermenting materials, dung, tan, flues, or hot-water pipes. In some cases solar heat is as it were entrapped by placing beneath the roots substances such as bricks, the heat previously absorbed by which is slowly radiated. In winter the temperature of the soil, out of doors, beyond a certain depth is usually higher than that of the atmosphere, so that the roots are in a warmer and more uniform medium than are the upper parts of the plant. Often the escape of heat from the soil is prevented by "mulching," *i.e.*, by depositing on it a thick layer of litter, straw, dead leaves, and the like.

The *Stem* and its subdivisions or branches lengthen, not only near the tip, but also lower down, by intercalary growth. They upraise to the light and air the leaves and flowers, and serve as channels for the passage to them of fluids from the roots, and they act as reservoirs for nutritive substances. Their functions in annual plants cease after the ripening of the seed, while in plants of longer duration layer after layer of strong, woody tissue is formed, which enables them to bear the strains which the weight of foliage and the exposure to wind, etc., entail. The gardener aims usually at producing stout, robust, short-jointed stems, instead of long, lanky growths defective in woody tissue. To secure these conditions free exposure to light and air is requisite, but in the case of coppice woods, or where long, straight spars are needed by the forester, plants are allowed to grow thickly so as to ensure development in an upward rather than in a lateral direction. This and like matters will, however, be more fitly considered in dealing hereafter with the buds and their treatment.

Leaves.—The work of the leaves may briefly be stated to consist in the processes of nutrition and of respiration. Nutrition by the leaves includes the inhalation of air, and the combination, under the influence of light and in the presence of chlorophyll, of carbon from the carbonic acid gas in the air with hydrogen from the watery vapor it contains, oxygen being exhaled. There is also a process of true respiration, in which atmospheric oxygen unites with a portion of the carbon in the plant, and is evolved as carbonic acid gas.

Syringing, Etc.—In certain circumstances water is absorbed by the surface of leaves, especially when the supply of moisture at the root is defective, and when by too long exposure to drought the watery constituents of the plant have evaporated. A certain amount of superfluous watery fluid or vapor is a necessary accompaniment of nutrition, but this may easily become excessive, especially where the plant cannot readily recoup itself. In these circumstances such operations as "syringing" and "damping down" are of special value. Evaporating basins or tanks in houses for orchids and other plants are beneficial for like reasons. Following Boussingault and Henslow, by whom the absorption of water by leaves has been proved, we may sum up the advantages of syringing as follows:—it washes off dust and insects from the leaves, and by moistening the cuticle promotes respiration and the absorption of water; it checks loss by transpiration, and so enables terminal shoots and young leaves to receive a sufficiency of sap from the stem; it keeps the air cool by evaporation; and lastly, as moisture is actually imbibed by the green parts of plants, it helps to compensate for any loss from within, and thus supplements root absorption.

In accordance with the facts just cited it is found that the preservation of cut flowers is promoted by inserting some of their leaves as well as their stalks in water. By cutting an herbaceous stem under water, so that the severed end is never exposed to the air, withering can to a large extent be prevented; and a bouquet may be

VEGETABLES

1. Branching Tree-Cabbage

2. Crisped Kale

5. Erfurt Kale

3. Dutch Cabbage

4. Brunswic Kale

6. Blumenthal Savoy Cabbage

7. Brussels Sprouts

8. Cauliflower

9. Short-Leafed Cabbage Turnip

10. Early Turnip

11. Parsian Carrot

12. Dutch Carrot

13. Frankfurt Carrot

14. Erfurt Turnip-Rooted Celery

15. Erfurt Dark-Red Beet-Radish

16. Long Black Winter Radish

17. Erfurt Round Winter Radish

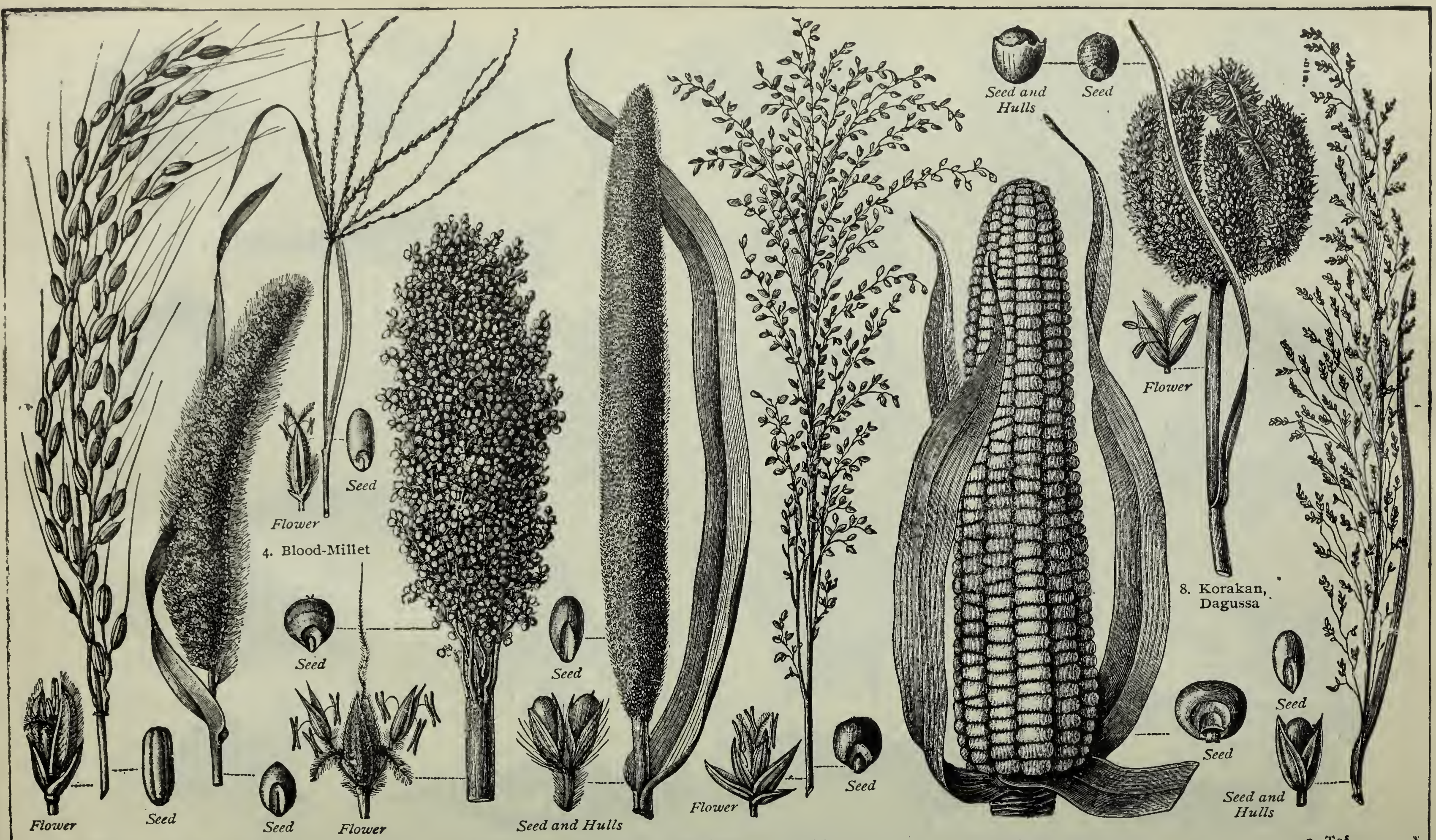
20. Oval Little Radish

21. Long Little Radish

18. Munich Beer-Radish

19. Round Little Radish

GRAIN



1. Rice 2. Italian Millet 4. Blood-Millet 5. Indian Millet, (Sorghum) 6. Millet of Mauritania 3. Millet 7. Corn 8. Korakan, Dagussa 9. Tef

kept fresh for a long time either by immersing the whole in water, or by simply covering the vase of water in which it is placed with a bell-glass. In the case of "cuttings" excessive transpiration is obviated by means of bell-glasses and by shading, and sometimes by burying a portion of the cutting with a leaf attached.

Carnivorous Plants.—Before leaving the subject of nutrition by the leaves, reference may be made to the so-called carnivorous plants, *e.g.*, *Drosera.* Substances, particularly such as contain nitrogen, as insects or fragments of meat, when brought into contact with the surface of the leaves, or with certain glands on the leaves, become dissolved by the agency of a digestive ferment secreted therein, are then absorbed and serve as nutriment. (See INSECTIVOROUS PLANTS.)

Respiration, already alluded to, is not directly connected with exposure to light, since it goes on as freely by night as it does by day. It is a process requisite for the health of the plant, and contributes to maintain its heat, to perfect its structure, to eliminate some of its secretions, and to destroy effete or impure matters. Chlorophyll, according to Pringsheim, acts as a regulator of the respiration of plants by absorbing some of the luminous rays, and thereby favoring the function of assimilation.

As a result of the processes carried on in the leaves under the influence of light, many of the secretions, as starch, sugar, oils, and coloring and odoriferous matters, are formed. These either at once subserve the nutrition of the plant or are stored in its tissues, as in the case of tubers and many seeds. Usually before it can be rendered available as nourishment the stored matter has to undergo a change from a more or less insoluble to a soluble form. The changes which they undergo within the plant require very careful study, and indeed constitute a department of physiology still very greatly in need of elucidation. Pringsheim's recent researches on the action of light on chlorophyll, prosecuted with the aid of a small lens and observed under the microscope, bid fair, if confirmed, materially to change the views of chemists as to the processes which go on in leaves as a consequence of exposure to light; but, although they may change or even reverse our notions as to the mode of action of chlorophyll, they will not detract from its importance.

Buds.—The recognition of the various forms of buds, and their modes of disposition in various plants, is a matter of the first consequence in the operations of pruning and training. Flower-buds may be produced on the old wood, *i.e.*, the shoots of the past year's growth, or on a shoot of the present year. The pear and the rhododendron develop flower-buds for the next season, speedily after blossoming, and these may be stimulated into premature growth. The peculiar short stunted branches or "spurs" which bear the flower-buds of the pear, apple, and their allies, and of the laburnum, deserve special attention. In the rose, in which the flower-buds are developed at the ends of the young shoots of the year, we have an example of a plant destitute of flower-buds during the winter.

Propagation by Buds.—The detached leaf-buds (*gemmæ* or *bulbils*) of some plants are capable under favorable conditions of forming new plants. The edges of the leaves of *Bryophyllum calycinum* and of *Cardamine pratensis*, and the axils of the leaves of *Lilium bulbiferum* produce buds of this character. It is a matter of familiar observation that the ends of the shoots of brambles take root when bent down to the ground. In rare instances buds form on the roots, and may be used for purposes of propagation, as in the Japan quince. Of the tendency in buds to assume an independent existence, gardeners avail themselves in the operations of striking "cuttings," and making layers and "pipings," as also in budding and grafting. In taking a slip or cutting, the gardener removes from the parent plant one or more buds or "eyes," in the case of the vine one only, attached or not to a short shoot, and places them in a moist and sufficiently warm situation, where, as previously mentioned, undue evaporation from the surface of the leaf or leaves is prevented. For some cuttings pots filled with light soil, with the protection of the propagating house and of bell-glasses, are requisite; but for many, such as willows, no such precautions are necessary, and the thrusting of the end of a shoot into moist ground suffices to insure its growth. In the case of the more delicate plants, the formation of roots is preceded by the production from the cambium of the cuttings of a succulent mass of tissue, the *callus.* It is important in some cases to retain on the cutting some of its leaves, so as to supply the requisite food for storage in the callus. In other cases, where the buds themselves contain a sufficiency of nutritive matter for the young growths, the retention of leaves is not necessary. In the tissues of willow-stakes just referred to, there exists an abundance of material available for the supply of the young roots. The most successful mode of forming roots is to place the cuttings in a mild bottom-heat, which expedites their growth, even in the case of many hardy plants whose cuttings strike roots in the open soil. With some hard-wooded trees, as the common white-thorn, roots cannot be obtained without bottom-heat. It is a general rule throughout plant culture that the activity of the roots shall be in advance of that of the leaves. Cuttings of deciduous trees and shrubs succeed best if planted early in autumn while the soil still retains the solar heat absorbed during summer. For evergreens April or May and August or September, and for greenhouse and stove plants, the spring and summer months, are the times most suitable for propagation by cuttings. The great object to be attained is to secure the formation of active roots before the approach of winter.

Layering consists simply in bending down a branch and keeping it in contact with or buried to a small depth in the soil until roots are formed; the connection with the parent plant may then be severed. Many plants can be far more easily propagated thus than by cutting.

Grafting or "*working*" consists in the transfer of a branch, the "graft" or "scion," from one plant to another, which latter is termed the "stock." The operation must be so performed that the growing tissues, or cambium-layer of the scion, may fit accurately to the corresponding layer of the stock. In *budding*, as with roses and peaches, a single bud only is implanted. *Inarching* is essentially the promotion of the union of one shoot to another of a different plant. The outer bark of each being removed, the two shoots are kept in contact by ligature until union is established, when the scion is completely severed from its original attachments. This operation is varied in detail according to the kind of plant to be propagated, but it is essential in all cases that the affinity between the two plants be near, that the union be neatly affected, and that the ratio as well as the season of growth of stock and scion be similar.

The selection of suitable stocks is a matter still requiring much scientific experiment. The object of grafting is to expedite and increase the formation of flowers and fruit. Strong-growing pears, for instance, are grafted on the quince stock in order to restrict their tendency to form "gross" shoots and a superabundance of wood in place of flowers and fruit. Apples, for the same reason, are "worked" on the "paradise" or "doucin" stocks, which from their influence on the scion are known as dwarfing stocks. Scions from a tree which is weakly, or liable to injury by frosts, are strengthened by engrafting on robust stocks. Lindley has pointed out that, while in Persia, its native country, the peach is probably best grafted on the peach, or on its wild type the almond, in England, the summer temperature of whose soil is much lower than that of Persia, it might be expected, as experience has proved, to to be most successful on stocks of the native plum.

The soil on which the stock grows is a point demanding attention. The form and especially the quality of fruit is more or less affected by the stock upon which it is grown. The effects produced by stock on scion, and more particularly by scion on stock, are, as a rule, with difficulty appreciable. Nevertheless, in exceptional cases modified growths, termed "graft-hybrids," have been obtained, which have been attributed to the commingling of the characteristics of stock and scion. Of these the most remarkable example is *Cytisus Adami*, a tree which year after year produces some shoots, foliage and flowers like those of the common laburnum, others like those of the very different looking dwarf shrub *C. purpureus*, and others again intermediate between these. We may hence infer that *C. purpureus* was grafted or budded on the common laburnum, and that the intermediate forms are the result of graft-hybridization. Numerous similar facts have been recorded. Among gardeners the general opinion is against the possibility of graft-hybridization. The wonder, however, seems to be that it does not occur more frequently, seeing that fluids must pass from stock to scion, and matter elaborated in the leaves of the scion must certainly, to some extent, enter the stock. It is clear, nevertheless, from examination, that as a rule the wood of the stock and the wood of the scion retain their external characters year by year without change. Still, as in the laburnum just mentioned, in the variegated jasmine and in *Abutilon Darwinii*, in the copper beech and in the horse-chestnut, the influence of a variegated scion has occasionally shown itself in the production from the stock of variegated shoots.

Double grafting is sufficiently explained by its name. By means of it a variety may often be propagated, or its fruit improved, in a way not found practicable under ordinary circumstances. For its successful prosecution prolonged experiments in different localities and in gardens devoted to the purpose are requisite.

Planting.—By removal from one place to another the growth of every plant receives a check. How this check can be obviated or reduced, with regard to the season, the state of atmosphere, and the condition and circumstances of the plant generally, is a matter to be considered by the practical gardener.

As to season, it is now admitted with respect to deciduous trees and shrubs that the earlier in autumn planting is performed the better; although some extend it from the period when the leaves fall to the first part of spring, before the sap begins to move. If feasible, the operation should be completed by the end of November, while the soil is still warm with the heat absorbed during summer. Attention to this rule is specially important in the case of rare and delicate plants. Early autumn planting enables wounded parts of roots to be healed over, and to form fibrils, which will be ready in spring, when it is most required, to collect food for the plant. Planting late in spring should, as far as possible, be avoided, for the buds then begin to awaken into active life, and the draft upon the roots becomes great.

The best way of performing transplantation depends greatly on the size of the trees, the soil in which they grow, and the mechanical appliances made use of in lifting and transporting them. The smaller the tree the more successfully can it be removed. The more argillaceous and the less silicious the soil the more readily can balls of earth be retained about the roots. All planters lay great stress on the preservation of the fibrils; all, indeed, admit them to be indispensable for the absorption of nutriment. The point principally disputed is to what extent they can with safety be allowed to be cut off in transplantation. Trees and shrubs in thick plantations, or in sheltered warm places, are ill-fitted for planting in bleak and cold situations. During their removal it is important that the roots be covered, if only to prevent desiccation by the air. Damp days are therefore the best for the operation; the dryest months are the most unfavorable. Though success in transplanting depends much on the humidity of the atmosphere, the most important requisite is warmth in the soil; humidity can be supplied artificially, but heat cannot.

Pruning, or the removal of superfluous growths, is practiced in order to equalize the development of the different parts of trees, or to promote it in particular directions so as to secure a certain form, and, by checking undue luxuriance, to promote enhanced fertility. In the rose-bush, for instance, in which, as we have seen, the flower-buds are formed on the new wood of the year, pruning causes the old wood to "break," *i,e.*, to put forth a number of new buds, some of which will produce flowers at their extremities. The manner and the time in which pruning should be accomplished, and its extent, vary with the plant, the objects of the operation, *i.e.*, whether for the production of timber or fruit, the season, and various other circumstances. So much judgment and experience does the operation call for that it is a truism to say that bad pruning is worse than none. The removal of weakly, sickly, overcrowded, and gross infertile shoots is usually, however, a matter about which there can be few mistakes when once the habit of growth and the form and arrangement of the buds are known. Winter pruning is effected when the tree is comparatively at rest, and is therefore less liable to "bleeding" or outpouring of sap. Summer pruning or pinching off the tips of such of the younger shoots as are not required for the extension of the tree, when not carried to too great an extent, is preferable to the coarser, more reckless style of pruning. The injury inflicted is less and not so concentrated; the wounds are smaller, and have time to heal before winter sets in. The effects of badly executed pruning, or rather hacking, are most noticeable in the case of forest trees, the mutilation of which often results in rotting, canker and other diseases. Judicious and timely thinning so as to allow the trees room to grow, and to give them sufficiency of light and air, will generally obviate the need of the pruning-saw, except to a relatively small extent.

Training is a procedure adopted when it is required to grow plants in a limited area, or in a particular shape, as in the case of many plants of trailing habit. Judicious training also may be of importance as encouraging the formation of flowers and fruit. Growth in length is mainly in a vertical direction, or at least at the ends of the shoots; and this should be encouraged, in the case of a timber tree, or of a climbing plant which it is desired should cover a wall quickly; but where flowers or fruit are specially desired, then, when the wood required is formed, the lateral shoots may often be trained more or less downward to induce fertility. The refinements of training, as of pruning, may, however, be carried too far; and not infrequently the symmetrically trained trees of the French excite admiration in every respect save fertility.

Sports or Bud Variations.—Here we may conveniently mention certain variations from the normal condition in the size, form, or disposition of buds or shoots on a given plant. An inferior variety of pear, for instance, may suddenly produce a shoot bearing fruit of superior quality; a beech tree, without obvious cause, a shoot with finely divided foliage; or a camellia an unwontedly fine flower. When removed from the plant and treated as cuttings or grafts, such sports may be perpetuated. Many garden varieties of flowers and fruits have thus originated. The cause of their production is very obscure. In certain instances where plants have been "crossed" or hybridized, perhaps for generations, the phenomenon may be explained on the supposition of a dissociation of previously mixed elements, or of a reversion to some ancestral conditions.

Formation of Flowers.—Flowers, whether for their own sake or as the necessary precursors of the fruit and seed, are objects of the greatest concern to the gardener. As a rule they are not formed until the plant has arrived at a certain degree of vigor, or until a sufficient supply of nourishment has been stored in the tissues of the plant. The reproductive process of which the formation of the flower is the first stage being an exhaustive one, it is necessary that the plant, as gardeners say, should get "established" before it flowers. Moreover, although the green portions of the flower do indeed perform the same office as the leaves, the more highly colored and more specialized portions, which are further removed from the typical leaf-form, do not carry on those processes for which the presence of chlorophyll is essential; and the floral organs may, therefore, in a rough sense, be said to be parasitic upon the green parts. A check or arrest of growth in the vegetative organs seems to be a necessary preliminary to the development of the flower. The flower itself is always the modified extremity of a shoot or stalk, which only exceptionally lengthens beyond the flower, as for example, in "proliferous" roses.

A diminishing supply of water at the root is requisite, so as to check energy and growth, or rather to divert it from leaf-making. Partial starvation will sometimes effect this; hence the grafting of free-growing fruit-trees upon dwarfing stocks, as before alluded to, and also the "ringing" or girdling of fruit-trees, *i. e.*, the removal from the branch of a ring of bark, or the application of a tight cincture, in consequence of which the growth of the fruits above the wound or the obstruction is enhanced. On the same principle the use of small pots to confine the roots, root-pruning and lifting the roots, and exposing them to the sun, as is done in the case of the vine in some countries, are resorted to. A higher temperature, especially with deficiency of moisture, will tend to throw a plant into a flowering condition.

Forcing.—The operation of forcing is based upon the facts just mentioned. By subjecting a plant to a gradually increasing temperature, and supplying water in proportion, its growth may be accelerated; its season of development may be, as it were, anticipated; it is roused from a dormant to an active state. Forcing, therefore, demands the most careful adjustment of temperature and supplies of moisture and light.

Deficiency of light is less injurious than might at first be expected, because the plant to be forced has stored up in its tissues, and available for use, a reserve stock of material formed through the agency of light in former seasons. The intensity of the color of flowers and the richness of flavor of fruit are, however, deficient where there is feebleness of light. Recent experiments of Doctor Siemens have shown that the gardener may avail himself of the electric light, which is proved to exercise on chlorophyll the same kind of influence as do the solar rays, and that he may thus supply the deficiencies of natural illumination. The employment of that light for forcing purposes would seem to be at present a question of expense. The great advantage hitherto obtained from its use has consisted in the rapidity with which flowers have been formed and fruits ripened under its influence, circumstances which go toward compensating for the extra cost of production.

Double Flowers.—The taste of the day demands that "double flowers" should be largely grown. Though in some instances, as in hyacinths, they are decidedly less beautiful than single ones, they always present the advantage of being less evanescent. Under the vague term of "double" many very different morphological changes are included. The flower of a double dahlia, *e. g.*, offers a totally different condition of structure from that of the rose or a hyacinth. The double poinsettia, again, owes its so-called double condition merely to the increased number of its scarlet involucral leaves, which are not parts of the flower at all. It is reasonable, therefore, to infer that the causes leading to the production of double flowers are varied. A good deal of difference of opinion exists as to whether they are the result of arrested growth or of exuberant development, and accordingly whether restricted food or abundant supplies of nourishment are the more necessary for their production. It must suffice here to say that double flowers are most commonly the result of the substitution of brightly-colored petals for stamens or pistils, or both, and that a perfectly double flower where all the stamens and pistils are thus metamorphosed is necessarily barren. Such a plant must needs be propagated by cuttings. It rarely happens, however, that the change is quite complete throughout the flower, and so a few seeds may be formed, some of which may be expected to reproduce the double-blossomed plants. By continuous selection of seeds from the best varieties, and "roguing" or eliminating plants of the ordinary type, a "strain" or race of double flowers is gradually produced.

Formation of Seed—Fertilization.—In fertilization—the influence in flowering plants of the sperm-cell, or its contents upon the germ-cell—there are many circumstances of importance horticulturally, to which, therefore, brief reference must be made. Flowers, generally speaking, are either self-fertilized, cross-fertilized or hybridized. Self-fertilization occurs when the pollen of a given flower affects the germ-cell of the same individual flower. Such a flower is hermaphrodite functionally as well as structurally. In self-fertilizing flowers the structure is such that the pollen inevitably comes in contact with the stigma; but fertilization is also dependent on the simultaneous maturity of pollen and stigma. Cross-fertilization varies both in manner and degree. In the simplest instances the pollen of one flower fertilizes the ovules of another on the same plant, owing to the stamens arriving at maturity in any one flower earlier or later than the pistils. Such flowers, though structurally hermaphrodite, are, at any given time, functionally unisexual. In many plants a polymorphic condition cocurs; thus, in the same species of primrose some flowers have the stamens short, and within the tube of the corolla, with the style projecting beyond the mouth, giving the appearance termed "pin-eyed," while others, known as "thrum-eyed" present exactly reverse conditions of stamens and style. In the common loosestrife, *Lythrum Salicaria*, the stamens are of three lengths and the styles differ correspondingly. In such di- or tri-morphic flowers, as Mr. Darwin's experiments have shown, the most complete fertility occurs when a cross is effected between a flower having short stamens and one with short styles. It is asserted that, not only is such a union more fertile than when pollen from a short stamen is placed on a long style, or *vice versa,* but the seedling plants are as a rule more vigorous.

Cross-fertilization must of necessity occur when the flowers are structurally unisexual, as in the hazel, in which the male or female flowers are monœcious, or separate on the same plant, and in the willow, in which they are diœcious, or on different plants. A conspicuous example of a diœcious plant is the common aucuba, of which for years only the female plant was known in Britain. When, through the introduction of the male plant from Japan, its fertilization was rendered possible, ripe berries, before unknown, became common ornaments of the shrub.

The conveyance of pollen from one flower to another in cross-fertilization is effected naturally by the wind, or by the agency of insects and other creatures. Flowers that require the aid of insects usually offer some attraction to their visitors in the shape of bright color, fragrance, or sweet juices. The color and markings of a flower often serve to guide the insects to the honey, in the obtaining of which they are compelled either to remove or to deposit pollen. The reciprocal adaptations of insects and flowers demand attentive observation on the part of the gardener concerned with the growing of grapes, cucumbers, melons, and strawberries, or with the raising of new and improved varieties of plants. Scarcely less remarkable, though not so important in the present connection, are the means by which the visits of such insects as are useless for the purpose of fertilization, or even injurious to the plant, as preying without advantage to it on its secretions, are prevented or rendered ineffective. In wind-fertilized plants the flowers are comparatively inconspicuous and devoid of much attractions for insects; and their pollen-cells are smoother and smaller, and better adapted for transport by the wind, than those of insect-fertilized plants, the roughness of which adapts them for attachment to the bodies of insects.

Although the general facts with respect to fertilization are as above stated, it must be remembered that probably self-fertilization is not constant in any plant under all circumstances, and that it certainly does sometimes take place in flowers which are usually cross-fertilized. It may be that, while continued self-fertilization ensures the perpetutation of certain qualities, cross-fertilization induces beneficial variation. Some botanists doubt the injurious effects attributed to self-fertilization, and, so long as a plant is healthy, it can be attended with but little disadvantage; but after a time in any case a cross is probably useful, and sometimes fertility is found to be much greater, and, in rare instances, only possible, when impregnation is effected by pollen not produced by a flower's own stamens.

It is very probable that the same flower at certain times and seasons is self-fertilizing, and at others not so. The defects which cause gardeners to speak of certain vines as "shy setters," and of certain strawberries as "blind," may be due either to unsuitable conditions of external temperature, or to the non-accomplishment, from some cause or other, of cross-fertilization. In a vinery or a peach-house it is often good practice at the time of flowering to tap the branches sharply with a stick so as to ensure the dispersal of the pollen. Sometimes more delicate and direct manipulation is required, and the gardener has himself to convey the pollen from one flower to another, for which purpose a small camel's-hair pencil is generally suitable. The degree of fertility varies greatly according to external conditions, the structural and functional arrangements just alluded to and other causes which may roughly be called constitutional. Thus, it often happens that an apparently very slight change in climate alters the degree of fertility. Certain plants which seem almost sterile with their own pollen become fertile if grafted on some others. In a particular country or at certain seasons one flower will be self-sterile or nearly so, and another just the opposite. The influence of conditions on the formation of "races," and the consequent importance to the horticulturist seeking to obtain new and improved strains of crossing-plants grown in different localities, have been specially insisted on by Darwin. The advantages of this practice are analogous to those accruing from what gardeners call "change of seed," *i. e.,* the sowing of seed or the planting of tubers, say of potatoes, in localities and on soils other than those in which they themselves were produced.

Hybridization.—Some of the most interesting results and many of the gardener's greatest triumphs have been obtained by hybridization, *i. e.,* the crossing of two individuals, not of the same, but of two distinct species of plants, as, for instance, two species of rhododendrom or two species of orchid. It is obvious that hybridization differs more in degree than in kind from cross-fertilization. The occurrence of hybrids in nature explains the difficulty experienced by botanists in deciding on what is a species, and the widely different limitations of the term adopted by different observers in the case of willows, roses, brambles, etc. The artificial process is practically the same in hybridization as in cross-fertilization, but usually requires more care. To prevent self-fertilization, or the access of insects, it is advisable to remove the stamens and even the corolla from the flower to be impregnated, as its own pollen or that of a flower of the same species is often found to be "prepotent." There are, however, cases, *e. g.,* some passion-flowers and rhododendrons, in which a flower is more or less sterile with its own, but fertile with foreign pollen, even when this is from a distinct species. It is a singular circumstance that reciprocal crosses are not always or even often possible; thus, one rhododendron may afford pollen perfectly potent on the stigma of another kind, by the pollen of which latter its own stigma is unaffected. With respect to the relations of the hydrid offspring, which partakes, sometimes more of the characteristics of the male or pollen parent, sometimes more of those of the female or seed parent, the opinions of practical experimenters are so diverse that at present no general rule can be established.

The object of the hybridizer is to obtain varieties exhibiting improvements in hardihood, vigor, size, shape, color, fruitfulness, or other attributes. His success depends not alone on skill and judgment for some seasons, or days even, are found more propitious than others. Although promiscuous and hap-hazard procedures no doubt meet with a measure of success, the best results are those which are attained by systematic work with a definite aim.

Hybrids are usually less fertile than pure-bred species, and are occasionally quite sterile. Some hybrids, however, are as fertile as pure-bred plants. Hybrid plants may be again crossed, or even re-hybridized, so as to produce a progeny of very mixed parentage. This is the case with many of our roses, dahlias, begonias, pelargoniums, and other long or widely cultivated garden plants.

Reversion.—In modified forms of plants there is frequently a tendency to "sport" or revert to parental or ancestral characteristics. So markedly is this the case with hybrids that in a few generations all traces of a hybrid origin may disappear. The dissociation of the hybrid element in a plant must be obviated by careful selection.

Germination.—The length of the period during which seeds remain dormant after their formation is very variable. The conditions for germinating are much the same as for growth in general. Access to light is not required, because the seed contains a sufficiency of stored-up food. The temperature necessary varies according to the nature and source of the seed. Some seeds require prolonged immersion in water to soften their shells; others are of so delicate a texture that they would dry up and perish if not kept constantly in a moist atmosphere. Seeds buried too deeply receive a deficient supply of air. As a rule, seeds require to be sown more deeply in proportion to their size and the lightness of the soil.

The time required for germination in the most favorable circumstances varies very greatly, even in the same species, and in seeds taken from one pod. Thus the seeds of *Primula japonica*, though sown under precisely similar conditions, yet come up at very irregular intervals of time. Germination is often slower where there is a store of available food in the perisperm or albumen, or in the embryo itself, than where this is scanty or wanting. In the latter case the seedling has early to shift for itself, and to form roots and leaves for the supply of its needs.

Selection.—Supposing seedlings to have been developed, it is found that a large number of them present considerable variations, some being especially robust, others peculiar in size or form. Those most suitable for the purpose of the gardener are carefully selected for propagation, while others not so desirable are destroyed; and thus after a few generations a fixed variety, race, or strain superior to the original form is obtained. Many garden plants have originated solely by selection; and it is certain that, quite independently of cross-breeding, much could still be done to improve our breeds of vegetables, flowers, and fruits by more systematic selection.

Large and well-formed seeds are to be preferred for harvesting. The seeds should be kept in sacks or bags in a dry place, and if from plants which are rare, or liable to lose their vitality, they are advantageously packed for transmission to a distance in bottles or jars filled with earth or sphagnum moss, without the addition of moisture. Cuttings and entire plants may be transported in wide-mouthed bottles.

It will have been gathered from what has been said that seeds cannot always be depended on to reproduce exactly the characteristics of the plant which yielded them; for instance, seeds of the greengage plum or of the Ribston pippin will produce a plum or an apple, but not these particular varieties, to perpetuate which grafts or buds must be employed.

THE PRACTICE OF HORTICULTURE.

The details of horticultural practice range under the three heads of flowers, fruits and vegetables. There are, however, certain general aspects of the subject which will be more conveniently noticed apart, since they apply alike to each department. We shall, therefore, first treat of these under four headings: — formation and preparation of the garden, garden structures and edifices, garden materials and appliances, and garden operations.

I. *Formation and Preparation of the Garden.*

1. *Site.*—Ground possessing a gentle inclination toward the south is desirable for a garden. On such a slope effectual draining is easily accomplished, and the greatest possible benefit is derived from the sun's rays. It is well also to have an open exposure toward the east and west, so that the garden may enjoy the full benefit of morning and evening sun, especially the latter; but shelter is desirable on the north and northeast, or in any direction in which the particular locality may happen to be exposed.

2. *Soil and Subsoil.*—A hazel-colored loam, moderately light in texture, is well adapted for most garden crops, whether of fruits or culinary vegetables, especially a good warm deep loam resting upon chalk; and if such a soil occurs naturally in the selected site, but little will be required in the way of preparation. If the soil is not moderately good and of fair depth, the situation is not an eligible one for gardening purposes. Wherever the soil is not quite suitable, but is capable of being made so, it is best to remedy the defect at the outset; and as it will be found easier to render a light soil sufficiently retentive than to make a tenacious clay sufficiently porous, a light soil is to be preferred to one which is excessively stiff and heavy. It is advantageous to possess a variety of soils; and if the gardens be on a slope, it will often be practicable to render the upper part light and dry, while the lower remains of a heavier and damper nature.

3. *Shelter.*—A screen of some kind to temper the fury of the blast is absolutely necessary. If the situation is not naturally well sheltered, the defect may be remedied by masses of forest trees disposed at a considerable distance so as not to shade the walls or fruit trees. They should not be nearer than, say, fifty yards, and may vary from that to 100 or 150 yards distance according to circumstances, regard being had especially to peculiarities occasioned by the configuration of the country, as for instance to ærial currents from adjacent eminences. Care should be taken, however, not to hem in the garden by crowded plantations, shelter from the prevailing strong winds being all that is required, while the more open it is in other directions the better.

4. *Water Supply.*—Although water is one of the most important elements in vegetable life, we do not find one garden in twenty where even ordinary precautions have been taken to secure a competent supply. Rain-water is the best, next to that river or pond water, and last of all that from springs. Iron pipes are the best conductors; they should lead to a capacious open reservoir placed outside the garden, and at the highest convenient level in order to secure sufficient pressure for effective distribution, and so that the wall trees also may be effectually washed. Standpipes should be placed at intervals beside the walks and in other convenient places from which water may at all times be drawn; and short flexible tubes should be made to fit onto them, to which a garden hose can be attached, so as to permit of the whole garden being readily and when necessary profusely watered.

5. *Walks and Edgings.*—The best material for the construction of garden walks is good binding gravel. The ground should be excavated to the depth of a foot or more—the bottom being made firm and slightly concave, so that it may slope to the center, where a drain should be introduced; or the bottom may be made convex and the water allowed to drain away at the sides. The bottom nine inches should be filled in compactly with hard, coarse materials, such as stones, brickbats, clinkers, burned clay, etc., on which should be laid two or three inches of coarse gravel, and then an inch or two of firm binding gravel on the surface. The surface of the walks should be kept well rolled, for nothing contributes more to their elegance and durability.

II. *Garden Structures.*

6. *Walls.*—The shelter afforded by a wall, and the increased temperature secured by its presence, are indispensable in some climates for the production of all the

finer kinds of outdoor fruits; and hence the inner side of a north wall, having a southern aspect, is appropriated to the more tender kinds. It is, indeed, estimated that such positions enjoy an increased temperature equal to 7° of latitude; that is to say, the mean temperature within a few inches of the wall is equal to the mean temperature of the open plain 7° farther south. The eastern and western aspects are set apart for fruits of a somewhat hardier character.

7. *Espalier Rails.*—Subsidiary to walls as a means of training fruit-trees, espalier rails were formerly much employed, and are still used in many gardens. In their simplest form, they are merely a row of slender stakes of larch or other wood driven into the ground, and connected by a slight rod or fillet at top. The use of iron rails has now been almost wholly discontinued on account of metallic substances acting as powerful conductors of both heat and cold in equal extremes. Trees trained to espalier rails have some advantages, as they are easily got at for cultural operations, space is saved, and the fruit, while freely exposed to sun and air, is tolerably secure against wind. They form, moreover, neat enclosures for the vegetable quarters, and provided excess of growth from the center is successfully grappled with, they are productive in soils and situations which are suitable.

8. *Plant Houses.*—These include all those structures which are more intimately associated with the growth of ornamental plants and flowers, and comprise conservatory, plant stove, greenhouse, and the subsidiary pits and frames. They should be so erected as to present the smallest extent of opaque surface consistent with stability. With this object in view, the early improvers of hothouse architecture substituted metal for wood in the construction of the roofs, and for the most part dispensed with back walls; but the conducting power of the metal caused a great irregularity of temperature, which it was found difficult to control; and, notwithstanding the elegance of metallic houses, this circumstance, together with their greater cost, and some doubt as to their durability, has induced most recent authorities to give the preference to wood. The combination of the two, however, shows clearly that without much variation of heat or loss of light, any extent of space may be covered, and houses of any altitude constructed.

Plant houses should be constructed of the best pine timber, as being the most durable, but the whole of the parts should be kept as light as possible. In many houses, especially those where ornament is of no consequence, the rafters are now omitted, or only used at wide intervals, somewhat stouter sash-bars being adopted, and stout panes of glass, 8 to 12 inches wide, made use of. Such houses are very light; being also very close, they require careful ventilation.

9. *Pits and Frames.*—These are used both for the summer growth and winter protection of various kinds of ornamental plants, for the growth of such fruits as cucumbers, melons, and strawberries, and for the forcing of vegetables. When heat is required, it is sometimes supplied by means of fermenting dung, or dung and leaves, or tanner's bark, but it is much more economically provided, on the score of labor at least, by hot-water pipes.

10. *Mushroom House.*—Mushrooms may be grown in sheds and cellars, or even in protected ridges in the open ground, but a special structure is usually devoted to them. A lean-to against the north side of the garden wall will be found suitable for the purpose, though a span-roofed form may also be adopted, especially if the buildings stand apart.

11. *Heating Apparatus.*—Plant houses are heated in a variety of ways, but practically smoke flues and hot-water pipes are principally made use of. The cost of erection is a little more for hot-water pipes than the flues, but the former are the cheaper in the end. Steam is not now used as a heating medium, except where the waste steam of a manufactory is turned to account in some adjoining garden. The use of fermenting vegetable substances in the production of heat is rapidly disappearing from our best gardens before the application of hot water, which is far more economical and certain in its effects.

12. *Ventilating Apparatus.*—The object of ventilation is not so much to aid the respiration of the plants as to carry off noxious vapors and to regulate the moisture and temperature. The mechanical agitation both of the atmosphere and of the foliage caused by a free circulation, provided it be not too cold or too rudely admitted, has also a beneficial influence on the health of the plants.

The mode of ventilating plant houses formerly in use was by letting down the top roof sashes; this was often supplemented by having the front or upright sashes also made movable, and more or less widely opened either outward or laterally during the daytime. It is much more economical, however, and equally efficacious, to have the roof sashes fixed, and the top ventilation effected by means of a lantern in the case of a span-roofed house, or by horizontal ventilators near the top of the back wall in a lean-to. The front ventilation may be effected by openings in the front wall opposite the heating pipes, by which means the cold air is warmed, which is the best plan in all houses where a high temperature has to be maintained, and is especially necessary in forcing-houses, on account of the risk of injury to the foliage from cold air; or the front sashes may be made movable, which is better in temperate houses. In the case of pits, where there are no front sashes provided, the ventilators are sufficient for the purpose. The sliding down of one sash over the other, as once generally and even now frequently practiced, generally augments the shade in oblique sunshine, and is strongly objectionable on that account. The lantern mode of construction obviates this, but in a lean to, and even with span roofs, it is better to have shorter movable sashes, hung so as to open by being elevated at a lower edge instead of sliding one over the other. A very slight elevation is sufficient for the egress of vitiated air.

13. *Hygrometry.*—For the healthy growth of plants, the regulation of the moisture is as necessary as the regulation of the heat. A considerable degree of moisture is necessary in the cases of most plants cultivated in a high temperature; but the amount varies, of course; in different cases, and this presents one of the principal difficulties in the management of what is called a mixed collection, whether of stove or greenhouse plants. In the case of fruits, where a house is mostly devoted to one subject, whether grapes, peaches, pines or melons, the requisite conditions can be more readily secured. The instrument with which the amount of moisture present in the atmosphere is measured is the hygrometer. The two hygrometers most generally used are Daniell's and the dry and wet bulb, the former a more delicate instrument, best adapted for scientific observations, the latter a simpler instrument better adapted for horticultural purposes, because requiring less delicate manipulation. It consists of two thermometers mounted on one frame, the readings of which when uncovered should correspond. One bulb is left uncovered, the other is covered with muslin, and a few threads of cotton, with their other

ends immersed in water, keep it constantly moist. The temperature is lowered by the evaporation from the moistened bulb, and the difference in the readings of the two thermometers shows the degree of dryness.

III. *Garden Materials and Appliances.*

14. *Soils and Composts.*—The principal soils used on gardens, either alone, or mixed to form what are called composts, are — loam, sand, peat, leaf-mold, and mixtures and combinations of these made up to suit the different subjects under cultivation.

Loam is the staple soil for the gardener; it is not only used extensively in the pure and simple state, but enters into most of the composts prepared specially for his plants. For garden purposes loam should be rather unctuous or soapy to the touch when moderately dry, not clinging nor adhesive, and should readily crumble when a compressed handful is thrown on the ground. If it clings together closely it is too heavy and requires amelioration by the admixture of gritty material; if it has no cohesion when squeezed tightly in the hand, it is too light, and needs to be improved by the addition of heavier or clayey material. Sound friable loam, cut one sod deep from the surface of a pasture, and stacked up for twelve months in a heap or ridge, is invaluable to the gardener. When employed for making vine borders, loam of a somewhat heavier nature can be used with advantage, on account of the porous materials which should accompany it. For stone fruits a calcareous loam is best; indeed, for these subjects a rich calcareous loam used in a pure and simple state cannot be surpassed. Somewhat heavy loams are best for melons and strawberries, and may be used with the addition of manures only; but for ornamental plants a loam of somewhat freer texture is preferable and more pleasant to work. Loam which contains much red matter (iron) should be avoided.

Sand is by itself of little value except for striking cuttings, for which purpose fine, clean, sharp silver sand is the best; and a somewhat coarser sand, if it is gritty, is to be preferred to the comminuted sands which contain a large proportion of earthy matter. River sand and the sharp grit washed up sometimes by the roadside are excellent materials for laying around choice bulbs at planting time to prevent contact with earth which is perhaps manure-tainted. Sea sand may be advantageously used both for propagating purposes and for mixing in composts, in order to give them the needful porosity to carry off all excess of moisture from the roots. If the finer earthy sands only are obtainable, they must be rendered sharper by washing away the earthy particles. Washed sand is best for all plants like heaths, which need a pure and lasting compost.

Peat soil is largely employed in the culture of rhododendrons, azaleas, heaths, etc. In districts where heather and gritty soil predominate, the peat soil is poor and unprofitable, but selections from both the heathy and the richer peat soils, collected with judgment, and stored in a dry part of the compost yard, are essential ingredients in the cultivation of many choice pot plants, such as the Cape heaths, and many of the Australian plants. Most monocotyledons do well in peat, even if they do not absolutely require it.

Leaf-mold is eminently suited for the growth of many free-growing plants, especially when it has been mixed with stable manure, and has been subjected to fermentation for the formation of hot-beds. In any state most plants feed greedily upon it, and when pure or free from decaying wood or sticks, it is a very safe ingredient in composts; but it is so liable to generate fungus, and the mycelium or spawn of certain fungi is so injurious to the roots of trees, attacking them if at all sickly or weakened by drought, that many cultivators prefer not to mix leaf-mold with the soil used for permanent plants, as peaches or choice ornamental trees. For quick-growing plants, however, as for example most annuals cultivated in pots, such as balsams, cockscombs, globe-amaranths, and the like, for cucumbers, and for young soft-wooded plants generally, it is exceedingly useful, both by preventing the consolidation of the soil and as a manure. The accumulations of light earth formed on the surface in woods where the leaves fall and decay annually are leaf-mold of the finest quality.

Composts are mixtures of the foregoing ingredients in varying proportions and in combination with manures if necessary, so as to suit particular plants or classes of plants. The chief point to be borne in mind in making these mixtures is not to combine in the same compost any bodies that are antagonistic in their nature, as for example lime and ammonia. In making up composts for pot plants, the fibrous portion should not be removed by sifting, except for small-sized pots, but the turfy portions should be broken up by hand and distributed in larger or smaller lumps throughout the mass. When sifting is had recourse to, the fibrous matter should be rubbed through the meshes of the sieve along with the earthy particles. Before being used the turfy ingredients of composts should lie together in a heap only long enough for the roots of the herbage to die, not to decompose.

15. *Manures.*—These are of two classes, organic and inorganic—the former being of animal and vegetable, the latter of mineral origin.

Farm-yard manure consists of the mixed dung of horses and cattle thrown together and more or less soaked with liquid drainings of the stable or byre. It is no doubt the finest stimulant for the growth of plants, and that most adapted to restore the fertile elements which the plants have abstracted from exhausted soils. This manure is best fitted for garden use when in a moderately fermented state.

Horse dung is generally the principal ingredient in all hot-bed manure; and in its partially decomposed state, as afforded by exhausted hot-beds, it is well adapted for garden use. It is most beneficial on cold stiff soils. It should not be allowed to lie too long unmoved when fresh, as it will then heat violently, and the ammonia is thus driven off. To avoid this, it should be turned over two or three times, if practicable, and well moistened — preferably with farm-yard drainings.

Cow dung is less fertilizing than horse dung, but being slower in its action it is more durable; it is also cooler, and therefore better for hot dry soils. Thoroughly decayed, it is one of the best of all manures for mixing in composts for florist's flowers and other choice plants.

Pig dung is very powerful, containing more nitrogen than horse dung; it is therefore desirable that it should undergo moderate fermentation, which will be secured by mixing it with litter and a portion of earth. When weeds are thrown to the pigs this fermentation becomes specially desirable to kill their seeds. The drainings of a pig-stye form a most valuable liquid manure for vegetable crops.

Night-soil is an excellent manure for all bulky crops, but requires to be mixed with earth or peat, or coal-ashes, so as both to deodorize it and to ensure its being equally distributed. Quick lime should not be used, as it dispels the greater part of the ammonia. When prepared by drying and mixing with various substances, night-soil is sold as poudrette, or desiccated night-soil, the value of which depends upon the materials used for admixture.

Malt-dust is an active manure frequently used as a top-dressing, especially for fruit-trees in pots. It is rapid in its action, but its effects are not very permanent. *Rape dust* is somewhat similar in its character and action.

Bones are employed as a manure with decided advantage both to vegetable crops and to fruit trees, as well as to flowers. For turnips bone manure is invaluable. The effects of bones are no doubt mainly due to the phosphates they contain, and they are most effectual on dry soils. They are most quickly available when dissolved in sulphuric acid.

17. *Guano.*—Peruvian guano was at one time imported from the Chincha Islands in enormous quantities; but the old deposits are practically exhausted, and the quality of the now available supply is comparatively poor. Ichaboe (off southwest Africa) guano is still imported, though in somewhat limited quantity; but it is much the richest available guano. The value of these guanos lies in the percentages of nitrogenous organic matter, ammonia salts, phosphates of the alkalies and of lime, and the potash salts which they contain. Some of the Islands in the South Pacific yield supplies of guano, but these are almost purely phosphatic, owing to the abundant rainfall of that region having washed out all the ammoniacal salts. Liebig's Guano and Liebig's Meat Meal are by-products from the preparation of Liebig's extract of meat. They are in a fine state of mechanical division, and are valuable sources of nitrogen and phosphates. Fish-guano is largely produced in Norway and the north of Scotland from fish offal. The process employed is essentially steaming to remove the oil, which is run off with the water; the solid residue is pressed and dried. The manurial constituents of this material are nitrogen and phosphates.

Dried Blood is another valuable source of nitrogen. Horn powder, shoddy and wool waste, leather raspings, etc., are also employed for the same purpose, but they are of much less value.

Pigeon-dung approaches guano in its power as manure. It should be laid up in ridges of good loamy soil in alternate layers to form a compost, which becomes a valuable stimulant for any very choice subjects if cautiously used. The dung of the domestic fowl is very similar in character.

Horn, *hoof-parings*, *woolen rags*, *fish blubber* and *blood* are all good manures and should be utilized if readily obtainable. *Sawdust* and *tan* are of less value.

Liquid manure, consisting of the drainings of dung-heaps, stables, cowsheds, etc., or of urine collected from dwelling houses or other sources, is a most valuable and powerful stimulant, and can be readily applied to the roots of growing plants. The urine should be allowed to putrefy, as in its decomposition a large amount of ammonia is formed, which should then be fixed by sulphuric acid or gypsum; or it may be applied to the growing crops after being freely diluted with water or absorbed in a compost heap. Liquid manures can be readily made from most of the solid manures when required, simply by admixture with water. When thus artificially compounded, unless for immediate use, they should be made strong for convenience of storage, and applied as required much diluted.

18. *Phosphatic Substances.*—The coprolites of Cambridge, Norfolk, and Suffolk come under this classification, as does also the land phosphate from the Ashley Basin of South Carolina, and the dredged phosphate from the Ashley and Cooper rivers. In addition to these we have Canadian apatite, Sombrero, Navassa, Somme, Belgian, Florida, Spanish, Curacao, and numerous other phosphates. These are of little value as manure in their natural and ground state, and are almost wholly converted into super-phosphate by the action of sulphuric acid, whereby the natural or tricalcic phosphate—which is insoluble in water—is converted into the monocalcic phosphate, which is soluble, and therefore readily available to plants.

Ammonia is the most powerful of the manures of the inorganic series, and one of the most important of the constituents of manures generally, since it is the chief source whence plants derive their nitrogen. It is largely supplied in all the most fertilizing of organic manures, but when required in the inorganic state must be obtained from some of the salts of ammonia, as the sulphate, the muriate, or the phosphate, all of which, being extremely energetic, require to be used with great caution. These salts of ammonia may be used at the rate of from two to three cwt. per acre as a top-dressing in moist weather. When dissolved in water they form active liquid manures.

19. *Sulphate of Ammonia* is principally derived from the destructive distillation of coal and shale. Its value depends upon the percentage of ammonia which it contains. This salt sometimes contains sulphocyanide of ammonium, a substance which is inimical to plant-life. Some experimentalists assert with all confidence that ammonia salts must undergrow nitrification before they can enter the plant; but that contention is scarcely now tenable, because nitrification is possible in some cases within the plant itself.

Nitrate of Soda or *Chili Saltpetre* is very extensively imported, and is sold on a basis of 95 per cent. nitrate, or "5 per cent. refraction"—*i. e.*, not more than 5 per cent. of impurities. It is found native in several districts of South America in an impure state, and is rendered marketable by a process of solution and recrystallizing. Its action as a manure is comparable to that of nitrate of lime, nitrate of potash, or sulphate of ammonia. Its only valuable constituent is nitric acid, while in the other nitrates mentioned the base is also serviceable.

Potash and *soda* are also valuable inorganic manures in the form of carbonates, sulphate, silicates, and phosphates, but the most extensively employed is the nitrate of potash.

Lime in the caustic state is beneficially applied to soils which contain an excess of inert vegetable matter and hence may be used for the improvement of old garden soils saturated with humus.

Gypsum, or sulphate of lime, applied as a top-dressing at the rate of two to three cwt. per acre, has been found to yield good results, especially on light soils. It is also employed in the case of liquid manures to fix the ammonia.

Burnt clay has a very beneficial effect on clay land by improving its texture and rendering soluble the alkaline substances it contains.

Vegetable refuse of all kinds, when smother-burned in a similar way, becomes a valuable mechanical improver of the soil; but the preferable course is to decompose it in a heap with quicklime and layers of earth, converting it into leaf-mold.

Soot forms a good top-dressing; it consists principally of charcoal, but contains ammonia, whence its value as a manure is derived. It should be kept dry until required for use. It may also be used beneficially in preventing the attacks of insects, such as the onion gnat and turnip fly, by dusting the plants or dressing the ground with it.

Common salt acts as a manure when used in moderate quantities, but in strong doses is injurious to vegetation.

20. *Tools, Implements, etc.*—With regard to garden tools, instruments, implements and machinery, it is only some of the more modern inventions and improvements, that can be touched on here. The two indispensable tools are the spade and the knife. The spade is commonly used for digging and trenching. The pitchfork or hoe is a very useful tool for breaking up the surface soil, the three-pronged end being used for the looser parts, and the mattock end for breaking clods, or when the surface has become much consolidated. The drag is also useful—a light, three-pronged tool, which may be used for loosening the soil among vegetable crops as well as flower garden plants, and may also be sometimes employed, if the tines are sufficiently narrow and pointed, to drag off weeds from the surface. The hand-fork, a short-handled, three-tined implement, is extremely handy for many purposes, such as loosening weeds for hand-weeding, or for planting or transplanting small subjects; it is also very handy for plunging pots, either indoors or out, in tan-beds, ash-beds, or common soil. Hoes and rakes made with tapered neck and socket, into which the handle is fitted, do not clog so readily as when they are driven into a ferruled handle.

For pruning purposes a variety of instruments have been invented, under the names of sécateurs, pruning-shears, pruning-scissors, etc., but nothing equals a well-tempered, old-fashioned knife, varied in form, strength, and size to suit the particular object to be operated on.

For the destruction of insects fumigators are useful, but an equally efficient plan is to put a few live embers in a flower pot, raised on two bricks so placed as not to close the hole at the bottom; on these embers moistened tobacco or tobacco paper is to be put, and over all damped moss. This will burn slowly and fill the house with smoke, care being taken that the material, as it dries, is lightly sprinkled with water, so that it does not burn into a flame.

Sulphurators are instruments for distributing flowers of sulphur, for the purpose of destroying mildew. In the case of greenhouse plants, such as heaths, simply dusting with sulphur through a muslin bag or dredger is sufficient; but in cases where vines are attacked with the *Oidium* or vine-mildew, the saving of the crop depends on the prompt diffusion of sulphur over all the affected parts, and this could not be so readily done by any other contrivance as by some one of the various forms of sulphurator.

For the distribution of water in the form of spray, syringes are used.

IV. *Garden Operations.*

21. *Propagation.*—The increase of plants, so far as the production of new individuals of particular kinds is concerned, is one of the most important and constantly recurring of gardening operations. In effecting this, various processes are adopted, which will now be described.

(1) *By Seeds.*—This may be called the natural means of increasing the number of any particular kind of plant, but it is to be remembered that we do not by that means secure an exact reproduction of the parent. We may get a progeny very closely resembling it, yet each plant possessing a distinct individuality of its own; or we may get a progeny very unlike the parent, or a mixed progeny showing various degrees of divergence. Many seeds will grow freely if sown in a partially ripened state; but, as a general rule, seeds have to be kept for some weeks or months in store, and hence they should be thoroughly ripened before being gathered. They should be sown in fine, rich soil, and such as will not readily get consolidated. In the case of outdoor crops, if the soil is inclined to be heavy, it is a good plan to cover all the smaller seeds with a light compost. Very small seeds should only have a sprinkling of light earth or of sand, and sometimes only a thin layer of soft moss to exclude light and preserve an equable degree of moisture. Somewhat larger seeds sown indoors may be covered to the depth of one-eighth or one-fourth of an inch, according to their size. Outdoor crops require to be sown, the smaller seeds from half an inch to an inch, and the larger ones from two to four inches under the surface, the covering of the smaller ones especially being light and open. Many seeds grow well when raked in; that is, the surface on which they are scattered is raked backward and forward until most of them are covered. Whatever the seeds, the ground should be made tolerably firm both beneath and above them; this may be done by treading in the case of most garden crops, which are also better sown in drills, this admitting the more readily of the ground being kept clear from weeds by hoeing. All seeds require a certain degree of heat to induce germination. For tropical plants the heat of a propagating house — 75° to 80°, with a bottom heat of 80° to 90° — is desirable, and in many cases absolutely necessary; for others, such as half-hardy annuals, a mild hotbed, or a temperate pit ranging from 60° to 70°, is convenient; while, of course, all outdoor crops have to submit to the natural temperature of the season. It is very important that seeds should be sown when the ground is in a good working condition, and not clammy with moisture.

(2) *By Offsets.*—This mode of increase applies specially to bulbous plants, such as the lily and hyacinth, which produce little bulbs on the exterior round their base. Most bulbs do so naturally to a limited but variable extent; when more rapid increase is wanted the heart is destroyed, and this induces the formation of a larger number of offsets. The stem bulbs of lilies are similar in character to the offsets from the parent bulb. The same mode of increase occurs in the gladiolus and crocus, but their bulb-like permanent parts are called corms, not bulbs. After they have ripened in connection with the parent bulb, the offsets are taken off, stored in appropriate places, and at the proper season planted out in nursery beds.

(3) *By Tubers.*—The tuber is a fleshy underground stem, furnished with eyes which are either visible, as in the potato and in some familiar kinds of *Tropæolum* (*T. tuberosum*) and of *Oxalis* (*O. crenata*), or latent, as in the Chinese yam (*Dioscorea Batatas*). When used for propagation, the tubers are cut up into what are called "sets," every portion having an eye attached being capable of forming an independent plant. The cut portions of bulky sets should be suffered to lie a short time before being planted, in order to dry the surface and prevent rotting; this should not, however, be done with such tropical subjects as caladiums, the tubers of which are often cut up into very small fragments for propagation, and of course require to be manipulated in a properly heated propagating pit. No eyes are visible in the Chinese yam, but slices of the long club-shaped tubers will push out young shoots and form independent plants, if planted with ordinary care.

(4) *By Division.*—Division, or partition, is usually resorted to in the case of tufted growing plants, chiefly perennial herbs; they may be evergreen, as chamomile or thrift, or when dormant may consist only of underground crowns, as larkspur or lily of the valley; but in either case the old tufted plant, being dug up, may be divided into separate pieces, each furnished with roots, and, when replanted, generally starting on its own account, without much check. Suffruticose plants and even small shrubs may be propagated in this way, by first planting them deeper than they are ordinarily grown, and then after the lapse of a year, which time

they require to get rooted, taking them up again and dividing them into parts or separate plants. Box-edging and southernwood are examples. The same ends may sometimes be effected by merely working fine soil in among the base of the stems, and giving them time to throw out roots before parting them.

(5) *By Suckers.*—Root suckers are young shoots from the roots of plants, chiefly woody plants, as may often be seen in the case of the elm and the plum. The shoots when used for propagation must be transplanted with all the roots attached to them, care being taken not to injure the parent plant. If they spring from a thick root it is not to be wantonly severed, but the soil should be removed, and the sucker taken off by cutting away a clean slice of the root, which will then heal and sustain no harm. Stem suckers are such as proceed from the base of the stem, as is often seen in the case of the currant and lilac. They should be removed in any case; when required for propagation they should be taken with all the roots attached to them, and they should be as thoroughly disbudded below ground as possible, or they are liable to continue the habit of suckering. In this case, too, the soil should be carefully opened and the shoots removed with a suckering iron, a sharp concave implement with long iron handle. When the number of roots is limited, the tops should be shortened, and some care in watering and mulching should be bestowed on the plant if it is of value.

(6) *By Runners.*—The young string-like shoots produced by the strawberry are a well-known example of suckers. The process of rooting those runners should be facilitated by fixing them close down to the soil, which is done by small wooden hooked pegs or by stones; hairpins, short lengths of bent wire, etc., may also be used. After the roots are formed, the strings are cut through, and the runners become independent plants.

(7) *By Proliferous Buds.*—Not unlike the runner, though growing in a very different way, are the bud-plants formed on the fronds of several kinds of ferns belonging to the genera *Asplenium*, *Woodwardia*, *Polystichum*, *Lastrea*, *Adiantum*, *Cystopteris*, etc. In some of these (*Adiantum caudatum*, *Polystichum lepidocaulon*) the rachis of the frond is lengthened out much like the string of the strawberry runner, and bears a plant at its apex. In others (*Polystichum angulare proliferum*), the stipes below and the rachis among the pinnæ develop buds, which are often numerous and crowded. In others again (*Woodwardia orientalis*, *Asplenium bulbiferum*), buds are numerously produced on the upper surface of the fronds. These will develop on the plant if allowed to remain. For propagation the bulbiferous portion is pegged down on the surface of a pot of suitable soil; if kept close in a moist atmosphere, the little buds will soon strike root and form independent plants. In the *Cystopteris* the buds are deciduous, falling off as the fronds acquire maturity, but, if collected and pressed into the surface of a pot of soil and kept close, they will grow up into young plants the following season.

(8) *By Layers.*—Layering consists in preparing the branch of a plant while still attached to the parent, bending it so that the part operated on is brought under ground, and then fixing it there by means of a forked peg. Some plants root so freely that they need only pegging down; but in most cases the arrest of the returning sap to form a callus, and ultimately young roots, must be brought about artificially, either by twisting the branch, by splitting it, by girding it closely with wire, by taking off a ring of bark, or by "tonguing." In tonguing the leaves are cut off the portion which has to be brought under ground, and a tongue or slit is then cut from below upward close beyond a joint, of such length that, when the cut part of the layer is pegged an inch or two (or in larger woody subjects three or four inches) below the surface, the elevation of the point of the shoot to an upright may open the incision, and thus set it free, so that it may be surrounded by earth to induce it to form roots. The whole branch, except a few buds at the extremity, is covered with soil. The best seasons for these operations are early spring and midsummer, that is, before the sap begins to flow, and after the first flush of growth has passed off. One whole summer, sometimes two, must elapse before the layers will be fully rooted in the case of woody plants; but such plants as carnations and picotees, which are usually propagated in this way, in favorable seasons take only a few weeks to root, as they are layered toward the end of the blooming season in July, and are taken off and planted separately early in the autumn.

In general, each shoot makes one layer, but in plants like the *Wistaria* or *Clematis*, which make long shoots, what is called serpentine layering may be adopted; that is, the shoot is taken alternately below and above the surface, as frequently as its length permits. There must, however, be a joint at the underground part where it is to be tongued and pegged, and at least one sound bud in each exposed part, from which a shoot may be developed to form the top of the young plant.

(9) *By Circumposition.*—When a plant is too high or its habit does not conveniently admit of its being layered, it may often be increased by what is called circumposition, the soil being carried up to the branch operated on. The branch is to be prepared by ringing or notching or wiring as in layering, and a temporary stand made to support the vessel which is to contain the soil. The vessel may be a flower-pot sawn in two, so that the halves may be bound together when used, or it may be a flower-pot or box with a side slit which will admit the shoot; this vessel is to be filled compactly with suitable porous earth, the opening at the slit being stopped by pieces of slate or tile. The earth must be kept moist, which is perhaps best done by a thick mulching of moss, the moss being also bound closely over the openings in the vessel, and all being kept damp by frequent syringings. Reid remarks of this method of propagation that he has effected it with clay and cowdung, well mixed, after the bark had been taken off all around, and wrapped about with a double or triple swaddling of straw or hay rope.

(10) *By Grafts.*—Grafting is so extensively resorted to that it is impossible here to notice all its phases. It is perhaps of most importance as the principal means of propagating our hardy kinds of fruit, especially the apple and the pear; but the process is the same with most other fruits and ornamental hardy trees and shrubs that are thus propagated, The stocks are commonly divided into two classes:—(1) free stocks, which consist of seedling plants, chiefly of the same genus or species as the trees from which the scions are taken; and (2) dwarfing stocks, which are of more diminutive growth, either varieties of the same species or species of the same or some allied genus as the scion, which have a tendency to lessen the expansion of the engrafted tree. The French Paradise is the best dwarfing stock for apples, and the quince for pears. In determining the choice of stocks, the nature of the soil in which the grafted trees are to grow should have full weight. In a soil, for example, naturally moist, it is proper to graft pears on the quince, because this plant not only thrives in such a soil but serves to check the luxuriance thereby produced. The scions should always be portions of the wood of the preceding year, selected from healthy parents; in the case of shy-bearing kinds, it is better to

obtain them from the fruitful branches. The scions should be taken off some weeks before they are wanted, and half-buried in the earth, since the stock at the time of grafting should in point of vegetation be somewhat in advance of the graft. During winter, grafts may be conveyed long distances, if carefully packed. If they have been six weeks or two months separated from the parent plant, they should be grafted low on the stock, and the earth should be ridged up around them, leaving only one bud of the scion exposed above ground. The best season for grafting apples and similar hardy subjects is the month of March; but it may be commenced as soon as the sap in the stock is fairly in motion, and may be continued during the first half of April.

Whip-grafting or *Tongue-grafting* is the most usual mode of performing the operation. The stock is headed off by an oblique transverse cut as shown at *a*, a slice is then pared off the side as at *b*, and on the face of this a tongue or notch is made, the cut being in a downward direction; the scion *c* is pared off in a similar way by a single clean sharp cut, and this is notched or tongued in the opposite direction as the figure indicates; the two are then fitted together as shown at *d*, so that the inner bark of each may come in contact at least on one side, and then tied around with damp, soft bast as at *e;* next some grafting clay is taken on the forefinger and pushed down on each side so as to fill out the space between the top of the stock and the graft, and a portion is also rubbed over the ligatures on the side where the graft is placed, a handful of the clay is then taken, flattened out, and rolled closely round the whole point of junction, being finished off to a tapering form both above and below, as shown by the dotted line *f*. To do this deftly, the hands should be plunged from time to time in dry ashes, to prevent the clay from sticking to them.

Cleft-drafting is another method in common use. The stock *a* is cut down from the horizontal cut *d*, and the scion, when cut to a thin wedge form, as shown at *c* and *e*, is inserted into the cleft; the whole is then bound up and clayed as in the former case. This is not so good a plan as whip-grafting; it is improved by sloping the stock on one side to the size of the graft.

Crown-grafting or *Rind-grafting* is preferable to cleft-grafting, inasmuch as it leaves no open spaces in the wood. The stock *b* is cut off horizontally or nearly so, and a slit is then cut in the bark *f*, *f*, a wedge-shaped piece of ivory being inserted to raise the bark; the scion is then cut to the same wedge-shaped form *g*, *h*, and inserted in the space opened for it between the albumen and the bark, after which it is tied down and clayed over in the manner already described.

Side-grafting is performed like whip-grafting, the graft being inserted on the side of a branch and not at the cut end of the stock. It may be practiced for the purpose of changing a part of the tree, and is sometimes very useful for filling out vacant spaces, in trained trees especially.

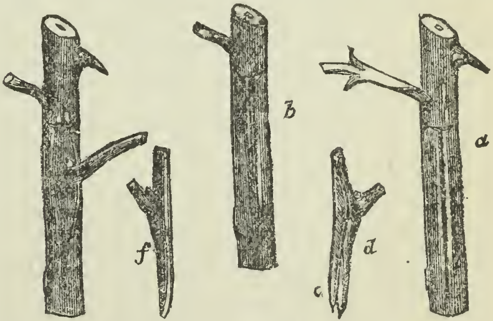
Inarching is another form of side-grafting. Here the graft is fixed to the side of the stock, which is planted or potted close to the plant to be worked. The branches are applied to the stock while yet attached to the parent tree, and remain so until united. In the case of trained trees, a young shoot is sometimes inarched to its parent stem to supply a branch where one has not been developed in the ordinary way.

For the propagation by grafts of stove and greenhouse plants the process adopted is whip-grafting or a modification of it. The parts are, however, so small that the tongue of the graft is dispensed with, and the two stems simply pared smooth and bound together. In this way hardy rhododendrons of choice sorts, greenhouse azaleas, the varieties of the orange family, camellias, roses, rare conifers, and numerous other plants are increased. In small subjects soft cotton is used for tying instead of bast, and grafting-wax is substituted for grafting-clay. The best is the French cold mastic "L'Homme Lefort." All grafting of this kind is done in the propagating house, at any season when grafts are obtainable in a fit state — the plants when operated on being placed in close frames warmed to a suitable temperature.

Root-Grafting is sometimes resorted to where extensive increase is an object, or where stem-grafting or other means of propagation are not available. In this case the scion is grafted directly onto a portion of the root of some appropriate stock, both graft and stock being usually very small; the grafted root is then potted so as to cover the point of junction with the soil, and is plunged in the bed of the propagating house, where it gets the slight stimulus of a gentle bottom heat. Dahlias and peonies may be grafted by inserting young shoots into the neck of one of the fleshy roots of each kind respectively — the best method of doing so being to cut a triangular section near the upper end of the root, just large enough to admit the young shoot when slightly pared away on two sides to give it a similar form. In the case of large woody plants thus worked the grafted roots, after the operation is completed, are planted in nursery beds, so that the upper buds only are exposed to the atmosphere, as shown at *c* in the figure.

(11) *By Buds.* — Budding is the inserting of a bud cut with a portion of bark of the plant to be propagated into the bark of the stock, where it is bound gently but firmly. Some fruits, such as peaches, apricots, plums, cherries, etc., are propagated in this way, as well as roses, and many other plants. In the propagating house budding may be done at any season when the sap is in motion; but for fruit-trees, roses, etc., in the open air, it is usually done in July or August, when the buds destined for the following year are completely formed in the axils of the leaves, and when the bark separates freely from the wood it covers. Those buds are to be preferred, as being best ripened, which occur on the middle portion of a young shoot.

The simplest and most generally practiced form of budding is that called *Shield-budding or* T*-budding.* The operator should be provided with a budding-knife in which the cutting edge of the blade is rounded off at the point, and which has a thin ivory or bone handle, for raising the bark of the stock. A horizontal incision is made in the bark quite down to the wood, and from this a perpendicular slit is drawn downward to the extent of perhaps an inch, so that the slit has a resemblance to the letter T, as at *a*. A bud is then cut by a clean incision from the tree intended to be propagated, having a proportion of the wood attached to it, and so that the whole may be an inch and a half long, as at *d*.



Shield-Budding.

The bit of wood *e* must be gently withdrawn, care being taken that the bud adheres wholly to the bark or shield, as it is called, of which *f* is a side view. The bark on each side of the perpendicular slit being then cautiously opened, as at *b*, with the handle of the knife, the bud and shield are inserted as shown at *c*. The upper tip of the shield is cut off horizontally, and brought to fit the bark of the stock at the transverse incision. Slight ties of soft cotton wool or worsted, or even moist bast-matting, are then applied. In about a month or six weeks the ligatures may be taken away, when, if the operation has been successful, the bud will be fresh and full, and the shield firmly united to the wood. In the following spring, a strong shoot will be thrown out, and to this the stock is headed down by gradations during the course of the summer.

To be successful the operation should be performed with a quick and light hand, so that no part of the delicate tissues be injured, as would happen if they were left for a time exposed, or if the bud were forced in like a wedge. The union is effected as in grafting, by means of the organizable sap or cambium, and the less this is disturbed until the inner bark of the shield is pressed and fixed against it the better. Inverted T-budding, in which the two incisions are in the form ⊥, is for some reasons preferable to the more ordinary method.

(12) *By Branch Cuttings.*—Propagation by cuttings is the mode of increase most commonly adopted, next to that by seeds. It is effected by taking a portion from a branch or shoot of the plant, and placing it in the soil. There are great differences to be observed in the selection and treatment of cuttings. Sometimes soft green shoots, as in *Verbena* (fig. *a*), are used; sometimes the shoots must be half-ripened, and sometimes fully matured. So of the mode of preparation; some will root if cut off or broken off at any point and thrust into wet earth or sand in a warm place (fig. *a*); others require to be cut with the utmost care just below a joint or leaf-base, and by a keen blade so as to sever the tissues without tearing or bruising; and others again after being cut across require to be split up for a short distance. It is usual and in most cases necessary to cut away the lower portion of a cutting up to just below the node or joint (fig. *b*, *d*, *e*). The internodal parts will not often divide so as to form separate individual plants; sometimes, however, this happens; it is said that the smallest piece of *Torenia asiatica*, for instance, will grow. Then as to position, certain cuttings grow readily enough if planted outdoors in the open soil, some preferring shade, others sunshine, while less hardy subjects must be covered with a bell-glass, or must be in a close atmosphere with bottom heat, or must have the aid of pure silver sand to facilitate their rooting (fig. *c*). Cuttings should in all cases be taken from healthy plants, and from shoots of a moderate degree of vigor. It is also important to select leafy growths, and not such as will at once run up to flower. Young shoots which have become moderately firm generally make the best cuttings, but sometimes the very softest shoots strike more readily. For all plants in a growing state spring is the safest time for taking cuttings.

Cuttings of deciduous plants should be taken off after the fall of the leaf, and should have all underground buds carefully removed so as to prevent, as far as possible, the formation of suckers. These cuttings should be about one foot in length, and should be planted at once in the ground so as to leave only the top with the two or three preserved buds exposed. If a clean stem, however, is desired, a longer portion may be left uncovered.

Cuttings of growing plants are prepared by removing with a sharp knife, and moderately close, the few leaves which would otherwise be buried in the soil; they are then cut clean across just below a joint; the fewer the leaves thus removed, however, the better, as if kept from being exhausted they help to supply the organizable matter out of which the roots are formed. Free-rooting subjects strike in any lightish, sandy mixture; but difficult subjects should have thoroughly well-drained pots, a portion of the soil proper for the particular plants made very sandy, and a surfacing of clean, sharp silver sand and about as deep as the length of the cutting.

(13) *By Leaf Cuttings.*—Many plants may be propagated by planting their leaves or portions of their leaves as cuttings, as, for example, the herbaceous *Gloxinia* (fig. *a*) and *Gesnera*, the succulent *Sempervivum*, *Echeveria*, *Pachyphytum*, and their allies, and such hard-leaved plants as *Theophrasta* (fig. *b*). The leaves are best taken off with the base whole, and should be planted in well-drained sandy soil; in due time they form roots, and ultimately from some latent bud a little shoot which forms the young plant. The treatment is precisely like that of branch cuttings. Gloxinias, begonias, etc., grow readily from fragments of the leaves cut clean through the thick veins and ribs, and planted edgewise like cuttings. This class of subjects may also be fixed flat on the surface of the cutting pot, by means of little pegs or hooks, the main ribs being cut across at intervals, and from these points roots and eventually young tubers will be produced. (See illustration, "Leaf Propagation.")

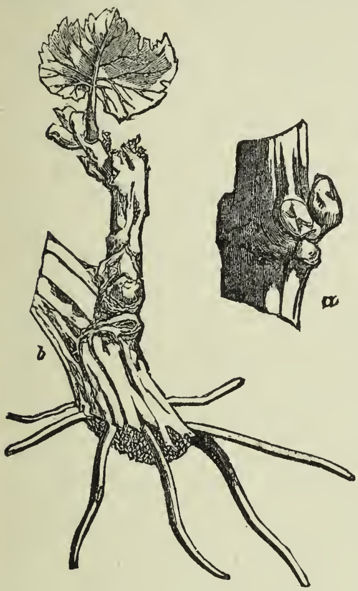
Leaf Propagation.

(14) *By Root Cuttings.*—Some plants which are not easily increased by other means propagate readily from root cuttings. Among the indoor plants which may be so treated, the *Bouvardia*, *Pelargonium*, *Aralia*, and *Wigandia* may be mentioned. The *modus operandi* is to turn the plant out of its pot, shake away the soil so as to free the roots. and then select as many pieces of the stouter roots as may be required. These are cut up into half-inch lengths (sometimes less) and inserted in light sandy soil around the margin of a cutting pot, so that the upper end of the root cutting may be level with the soil or only just covered by it. The pots should be watered so as to settle the soil, and be placed in the close atmosphere of the propagating pit or frame, where they will need scarcely any water until the buds are seen pushing through the surface.

There are various herbaceous plants which may be similiarly treated, such as sea-kale and horseradish, and, among ornamental plants, the beautiful autumn-blooming *Anemone japonica* and *Senecio pulcher*. The sea-kale and horseradish require to be treated in the open garden, where the cut portions should be planted in lines in well-worked soil; but the roots of the *Anemone* and *Senecio* should be planted in pots and kept in a close frame with a little warmth till the young shoots have started.

Various hardy ornamental trees are also increased in this way, as the quince, elm, robinia, and mulberry, and the rose among shrubs. The most important use to which this mode of propagation is put is, however, the increase of roses, and of the various plums used as stocks for working the choicer stone fruits. The method in the latter case is to select roots averaging the thickness of the little finger, to cut these into lengths of about three or four inches, and to plant them in lines just beneath the surface in nursery beds. The root cuttings of rose-stocks are prepared and treated in a similar way.

(15) *By Cuttings of Single Eyes.*—This mode of propagation is performed by cutting the branches into short lengths, each containing one well-matured bud or eye, with a short portion of the stem above and below. It is a common mode of propagating vines, the eyes being in this case cut from the ripened leafless wood. The eyes (fig. *a*) are planted just below the surface in pots of light soil, which are placed in a hotbed or propagating pit, and in due time each pushes up a young shoot which forms the future stem, while from about its base the young roots are produced (fig. *b*) which convert it into an independent plant. In the case of plants with persistent leaves, the stem may be cut through just above and below the bud, retaining the leaf which is left on the cutting, the old wood and eye being placed beneath the soil and the leaf left exposed. In thisway the india-rubber tree (*Ficus elastica*), for example, and many other tender plants may be increased with the aid of a brisk bottom heat. Many of the free-growing soft-wooded plants may also be grown from cuttings of single joints of the young wood, where rapid increase is desired; and in the case of opposite-leaved plants two cuttings may often be made from one joint by splitting the stem longitudinally, each cutting consisting of a leaf and a perfect bud attached to half the thickness of the stem.



Cutting of Single Eye.

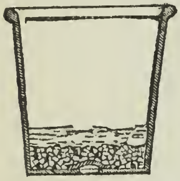
22. *Planting and Transplanting.*— In preparing a fruit tree for transplantation, the first thing to be done is to open a trench round it at a distance of from three to four feet, according to size. The trench should be opened to about two spades' depth, and any coarse roots which may extend thus far from the trunk may be cut clean off with a sharp knife. The soil between the trench and the stem is to be reduced as far as may seem necessary or practicable by means of a digging fork, the roots as soon as they are liberated being fixed on one side and carefully preserved. By working in this way all around the ball, the best roots will be got out and preserved, and the ball lightened of all superfluous soil. The tree will then be ready to lift if carefully prized up from beneath the ball, and if it does not lift readily, it will probably be found that a root has struck downward, which will have to be sought out and cut through. Whenever practicable, it is best to secure a ball of earth around the roots. On the tree being lifted from its hole the roots should be examined, and all which have been severed roughly with the spade should have the ends cut smooth with the knife to facilitate the emission of fibers. The tree can then be transported to its new position. The hole for its reception should be of sufficient depth to allow the base of the ball of earth, or of the roots, to stand so that the point whence the uppermost roots spring from the stem may be two or three inches above the general surface level. Then the bottom being regulated so as to leave the soil rather highest in the center, the plant is to be set in the hole in the position desired, and steadied there by hand. Next the roots from the lower portion of the ball are to be sought out and laid outward in lines radiating from the stem, being distributed equally on all sides as nearly as this can be done; some fine and suitable good earth should be thrown among the roots as they are thus being placed, and worked in well up to the base of the ball. The soil covering the roots may be gently pressed down, but the tree should not be pulled up and down, as is sometimes done, to settle the soil. This done, another set of roots higher up the ball must be laid out in the same way, and again another, until the whole of the roots, thus carefully laid, are embedded as firmly as may be in the soil, which may now receive another gentle treading. The stem should next be supported permanently, either by one stake or by three, according to its size. The excavation will now be filled up about two-thirds perhaps; and, if so, the tree may have a thorough good watering, sufficient to settle the soil closely about its roots. After twenty-four hours the hole may be leveled in, with moderate treading, if the water has soaked well in, the surface being left slightly sloping upward toward the stem of the tree. In transplanting trees of the ornamental class, less need be attempted in respect to providing new soil, although the soil should be made as congenial as practicable.

In transplanting smaller subjects, such as plants for the flower garden, much less effort is required. The plant must be lifted with as little injury to its rootlets as possible, and carefully set into the hole, the soil being filled in round it, and carefully pressed close by the hand. For moving small plants the garden trowel is a very convenient tool, but we are inclined to give the preference to the hand-fork. For larger masses, such as strong-growing herbaceous plants, a spade or digging-fork will be requisite.

When seedlings of vigorous plants have to be "pricked out," a dibble is the best implement to be used. The ground being prepared and, if necessary, enriched, and the surface made fine and smooth, a hole is made with the dibble deep enough and large enough to receive the roots of the seedling plants without doubling them up, and the hole is filled in by working the soil close to the plant with the point of the dibble. The pricking out of seedlings in pots in the propagating pit is effected in a similar way. The plants, indeed, often require to be removed and set from half an inch to an inch apart before they have become sufficiently developed to admit of being handled with any degree of facility, and for these a pointed stick of convenient size is used as a dibble. In extreme cases it is best to lift the little seedling on the end of a flattish pointed stick, pressing this into the new soil where the plant is to be placed, and liberating it and closing the earth about it by the aid of a similar stick held in the other hand.

Large trees may be successfully transplanted by the aid of transplanting machines, of which different forms are in use. These will be found figured and described in the various horticultural and arboricultural publications. The best season for transplanting deciduous trees is during the early autumn months. As regards evergreens opinions are divided, some preferring August and September, others April or May. They can be successfully planted at either period, but for subjects which are at all difficult to remove the spring months are to be preferred.

23. *Potting and Repotting.*—Garden pots are made with a comparatively large hole in the bottom, and those of the largest size have also holes at the side near the bottom; these openings are to prevent the soil becoming saturated or soured with superabundant water. To prepare the pot for the plant, a broadish piece of potsherd called a "crock," is placed over the large hole, and if there be side holes they are also covered. The bottom crock is made from a piece of a broken garden pot, and is laid with the convex side upward; then comes a layer of irregular pieces of crock of various sizes, about an inch deep in a five-inch pot, two inches in an eleven-inch or twelve-inch pot, etc. A few of the coarser lumps from the outer edge of the heap of potting soil are spread over the crocks. The same end, that of keeping the finer particles of the soil from mixing with the drainage crocks, may be attained by shaking in a little clean moss. A handful or two of the soil is then put in, and on this the plant with its roots spread out is to be set a trifle higher than the plant should stand in the pot when finished off; more soil is to be added, and the whole pressed firmly with the fingers, the base of the stem being just below the pot-rim, and the surface being smoothed off so as to slope a little outward. When finished off, the pots should be well watered, to settle the soil; but they should stand till the water has well drained away, since, if they are moved about while the fresh soil is very wet, there will be a risk of its becoming puddled or too much consolidated. Larger plants do not need quite such delicate treatment, but care should be taken not to handle the roots roughly. The soil for these should be less comminuted, and the amount of drainage material more ample. Larger bodies of soil also require to be more thoroughly consolidated before watering; otherwise they would settle down so as to leave an unsightly void at the pot-rim.


Section of Pot Showing Crocks.

Some plants, especially when potted temporarily, may be dealt with in a simpler way. A single crock may be used in some cases, and in others no crock at all, but a handful of half-decayed leaves or half-decayed dung thrown into the bottom of the pot. This mode of potting does well for bulbs, such as hyacinths, which are either thrown away or planted out when the bloom is over. The bedding plants generally may be potted in this way, the advantage being that at planting-out time there is less risk of disturbing the roots than if there were potsherds to remove. Plants of this character should be potted a little less firmly than specimens which are likely to stand long in the pot, and indeed the soil should be made comparatively light by the intermixture of leaf-mold or some equivalent, in order that the roots may run freely and quickly into it.

For epiphytal plants like orchids the most thorough drainage must be secured by the abundant use of potsherds, small pots being sometimes inserted inside the larger ones, or by planting in shallow pots or pans, so that there shall be no large mass of soil to get consolidated. For most of these the lightest spongy but sweet turfy peat must be used, this being packed lightly about the roots, and built up above the pot-rim, or in some cases freely mixed before use with chopped spagnum moss and nodules of broken pots or of charcoal. The plants under these conditions often require to be supported by wooden pegs or sticks. Some of the species grow better when altogether taken out of the soil and fixed to blocks of wood, but in this case they require a little coaxing with moss about the roots until they get established. In other cases they are planted in open baskets of wood or wire, using the porus peat and sphagnum compost. Both blocks and baskets are usually suspended from the roof of the house, hanging free, so that no accumulation of water is possible. In these cases, however, the greatest caution is necessary to prevent the plants from suffering from drought.

When repotting is adopted as a temporary expedient, as in the case of bedding-out plants which it is required to push forward as much as possible, it will suffice if provision is made to prevent the drainage hole from getting blocked, and a rich light compost is provided for the encouragement of the roots. When, however, a hard-wooded plant has to be repotted, the case is different; it may stand without further potting for one year or two years or more, and therefore much more care is necessary. The old ball of earth must be freed from all or most of the old crocks without doing injury to the roots, and the sharp edge of the upper surface gently rubbed off. If there be any sour or sodden or effete soil into which the roots have not run, this should be carefully picked out with a pointed stick. The ball is to be set on the new soil just high enough that when finished the base of the stem may be about level with the pot-rim, toward which the surface should slope gently, and the space between the old ball and the sides of the pot is to be filled in gradually with the prepared compost, which is from time to time to be pressed down with a blunt-ended flat piece of wood called a potting-stick, so as to render the new soil as solid as the old. The object of this is to prevent the plant from starving by the water applied all running off by way of the new soil, and not penetrating the original ball of earth. When this amount of pressure is necessary, especially in the case of loamy composts, the soil itself should be rather inclined to dryness, and should in no case be sufficiently moist to knead together into a pasty mass. In ordinary cases the potting soil should be just so far removed from dryness that when a handful is gently pressed it may hang together, but may lose its cohesion when dropped.

When plants are required to stand in ornamental china pots or vases, it is better both for the plants and for avoiding risk of breakage to grow them in ordinary garden pots of a size that will drop into the more valuable vessels. Slate pots or tubs, usually square, are sometimes adopted, and are durable and otherwise unobjectionable, only, their sides being less porous, the earth does not dry so rapidly, and some modification of treatment as to watering is necessary. For large conservatory specimens wooden tubs, round or square, are frequently used; these should be coated with pitch inside to render them more durable.

Various other contrivances take the place of garden pots for special purposes. Thus shallow square or oblong wooden boxes, made of light, inexpensive wood, are very useful for seed-sowing, for pricking out seedlings, or for planting cuttings. When the disturbance of the roots incidental to all transplanting is sought to be avoided, the seed or plant is started in some cases in squares of turf (used grassy side downward), which can when ready be transferred to the place the plant is to occupy. Cucumber and melon plants and vines reared from eyes are sometimes started in this way, both for the reason above mentioned, and because it prevents the curling of the roots apt to take place in plants raised in pots. Strips of turf are sometimes used for the rearing of early peas, which are sown in a warmish house or frame, and gradually hardened so as to bear exposure before removal to the open air.

24. *Watering.*—The guiding principle in watering plants is to do it thoroughly when it is required. and to abstain from giving a second supply till the first has been taken up.

When watering becomes necessary for kitchen-garden crops, the hose should be laid on and the lines of esculents allowed to drink their fill, if fresh succulent vegetables are desired. So also, if well-swelled and luscious fruits, such as strawberries, are required, there must be no parching at the roots. This applies even more strongly to conservatory borders and to forcing-houses than to the outside fruit-tree borders, because from these the natural rain supply is in most cases more distinctly cut off. In the case of forcing-houses, the water should be heated before being applied to the borders containing the roots of the trees.

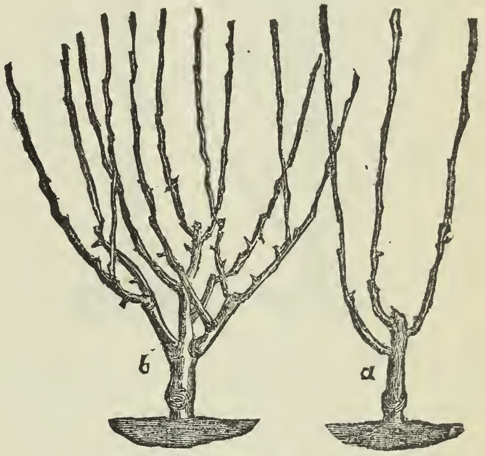
In the watering of pot plants the utmost care is requisite if the plant be a shy-growing or valuable one, and yet it is almost impossible to give any intelligible instruction for performing the operation. The roots should never be suffered either to get thoroughly dry or to get sodden with excess of water. An adept will know by the ring of the pot on striking it with his knuckles whether water is wanted or not, according as it rings loud and clear or dull and heavy. With very choice subjects watering may be necessary two or three times a day in drying summer weather. It is a wrong though common practice to press the surface of the soil in the pot in order to feel if it is moist enough, as this soon consolidates it, and prevents it from getting the full benefit of aëration.

In all heated houses the water used should be warmed at least up to the temperature of the atmosphere, so as to avoid chilling the roots. This is also necessary in the case of water used for syringing the plants, which should be done two or three times a day in all stoves and forcing-houses, especially during the period when the young growth is being developed. The damping of all absorbent surfaces, such as the floors or bare walls, etc., is frequently necessary several times a day in the growing season, so as to keep up a humid atmosphere; hence the advantage of laying the floors a little rounded, as then the water draws off to the sides against the curbstone, while the center remains dry for promenaders.

In cooler structures it becomes necessary in the dull season of the year to prevent the slopping of water over the plants or on the floor, as this tends to cause "damping off,"—the stems assuming a state of mildewy decay, which not infrequently, if it once attacks a plant, will destroy it piece by piece. For the same reason cleanliness and free ventilation are of great importance.

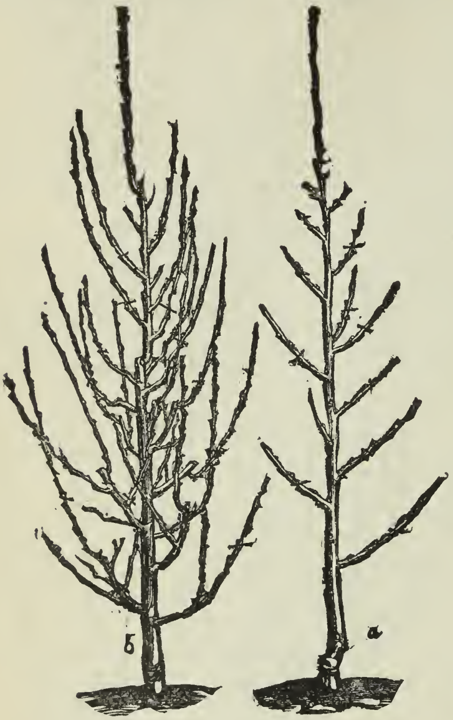
25. *Pruning.*—Pruning is a very important operation in the fruit garden, its object being twofold—(1) to give form to the tree, and (2) to induce the free production of flower buds as the precursors of a plentiful crop of fruit. To form a standard tree, either the stock is allowed to grow up with a straight stem, by cutting away all side branches up to the height required, say about six feet, the scion or bud being worked at that point, and the head developed therefrom; or the stock is worked close to the ground, and the young shoot obtained therefrom is allowed to grow up in the same way, being pruned in its progress to keep it single and straight, and the top being cut off when the desired height is reached, so as to cause the growth of lateral shoots. If these are three or four in number, and fairly balanced as to strength and position, little pruning will be required. The tips of unripened wood should be cut back about one-third their length at an outwardly placed bud, and the chief pruning thereafter required will be to cut away inwardly directed shoots which cross or crowd each other and tend to confuse the center of the tree. Bushy heads should be thinned out, and those that are too large cut back so as to remodel them. If the shoots produced are not sufficient in number, or are badly placed, or very unequal in vigor, the head should be cut back moderately close, leaving a few inches only of the young shoots, which should be pruned back to buds so placed as to furnish shoots in the positions desired. When worked at the top of a stem formed of the stock, the growth from the graft or bud must be pruned in a similar way. Three or four leading shoots should be selected to pass ere long into boughs and form a well-balanced skeleton for the tree; these boughs, however, will soon grow beyond any artificial system the pruner may adopt.

To form a dwarf or bush fruit tree the stock must be worked near the ground, and the young shoot produced from the scion or bud must be cut back to whatever height it is desired the dwarf stem should be, say one and one-half to two feet. The young shoots produced from the portion of the new wood retained are to form the skeleton of the bush tree, and must be dealt with as in the case of standard trees. The growth of inwardly directed shoots is to be prevented, and the center kept open, the tree assuming a cup-shaped outline. The illustration of dwarf pruning, reduced from M. Hardy's excellent work, *Traité de la Taille des Arbres Fruitiers*, will give a good idea how these dwarf trees are to be manipulated, *a* showing the first year's development from the maiden tree after being headed back, and *b* the form assumed a year or two later.



Dwarf-Tree Pruning.

In forming a pyramidal tree, the lateral growths, instead of being removed, as in the standard tree, are enencouraged to the utmost; and in order to strengthen them the upper part of the leading shoot is removed annually, the side branches being also shortened somewhat as the tree advances in size. In illustration of pyramid pruning, reduced from M. Hardy's work, *a* shows a young tree with its second year's growth, the upright shoot of the maiden tree having been moderately headed back, being left longer if the buds near the base promise to break freely, or cut shorter if they are weak and wanting in vigor. The winter pruning, carried out with the view to shape the tree into a well-grown pyramid, would be effected at the places marked by a cross line. The lowest branch would have four buds retained, the end one being on the lower side of the branch. The two next would be cut to three buds, which here also



Pyramid Pruning.

are fortunately so situated that the upper one is on the lower side of the branches. The fourth is not cut at all, its terminal bud being allowed to grow to draw strength into it. The fifth is an example where the bud to which the shoot should be cut back is wrongly placed; a shoot resulting from such a cut is apt instead of growing outward to grow erect, and lead to confusion in the form of the tree, to avoid which it is tied down in its proper place during the summer by a small twig. The upper shoots are cut closer in. Near the base of the stem are two prominent buds, which would produce two vigorous shoots, but these would be too near the ground, and the buds should therefore be suppressed; but, to strengthen the lower part, the weaker buds just above and below the lowest branch should be forced into growth, by making a transverse incision close above each. In the illustration, *b* shows what a similar tree would be at the end of the third year's growth.

In order to bring a young tree into the cordon shape, all its side branches are shortened back, either to form permanent spurs, as in the case of pears, or to yield annual young shoots, as in peaches and nectarines. The single-stemmed cordon may be trained horizontally, obliquely at any required angle, or vertically if required, the first two arrangements being preferable. If a double cordon is required, the original young stem must be headed back, and the two best shoots produced must be selected, trained right and left, and treated as for the single cordon.

The forms chiefly adopted for trees trained to walls and espalier rails are the fan-shaped, the half-fan, and the horizontal, with their various modifications.

Of late years the close pruning of the young trees has been objected to, and the "extension system" has, in many cases, been adopted. The maiden tree is headed down, and two shoots led away right and left. Two laterals should be allowed to grow from the upper side of them, one from near the base, the other from near the middle, all others being pinched out beyond the second or third leaf during summer, but cut away to the last bud in winter. The tree will thus consist of six shoots probably three feet to four feet long, which are not to be pruned unless they are unequal in strength, a defect which is rather to be remedied by summer pinching than by winter pruning. The second year three young shoots are to be left on each of the six, one close to the base, one about the middle, and one at the point, the rest being rubbed off. These three shoots will produce laterals, of which one or two may be selected and laid in; and thus a number of moderately strong fertile shoots will be obtained, and at the end of the season a comparatively large tree will be the result.

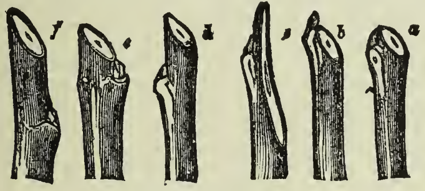
The method of pruning formerly adopted for the formation of a fan-shaped tree was to head down the maiden plant to about two eyes, so placed as to yield a young shoot on each side, the supernumerary shoots being rubbed off while quite young, and the reserved shoots trained against the wall during the summer so as to get them well matured. The next year they were cut back again, often nearly to the base, in order that the lower pair of these shoots might each produce two well-placed young shoots, and the upper pair three young shoots. The tree would thus consist of ten shoots, to be laid out at regular distances, and then if closely cut the skeleton of the tree would be as in second figure. These main shoots were not again to be shortened back, but from each of them three young shoots were to be selected and trained in two, on the upper side, one near the base, and the other half way up, and one on the lower side placed about midway between these two; these with the leading shoot, which was also to be nailed in, made four branches of the current year from each of the ten main branches, and the form of the tree would therefore be that of third figure. The other young shoots produced were pinched off while quite young, to throw all the strength of the tree into those which were to form its basis, and to secure abundant light and air. In after years the leading shoot was not to be cut back, but all the lateral shoots were to be shortened, and from these year by year other shoots were to be selected to fill up the area occupied by the tree.

In pruning for a horizontal tree the young maiden tree has to be headed back nearly to its base, and from the young shoots three are to be selected, the two best placed lower ones to form an opposite or nearly opposite pair of main branches, and the best placed upper one to continue the erect stem. This upper shoot is at the next winter pruning to be cut down to within about a foot of the point whence it sprung, and its buds rubbed off except the upper one for a leader, and one on each side just below it to furnish another pair of side shoots; these being trained in position, the tree would appear as in second figure. The same course is to be followed annually till the space is filled. Sometimes in very favorable soils and with vigorous trees two pairs of branches may be obtained in one season by summer-stopping the erect shoots and selecting others from the young growths thus induced, but more commonly the trees have to be built up by forming one pair of branches annually. The shoots are not at first lowered to the horizontal line, but are brought down gradually; and while the tree is being formed weak shoots may be allowed to grow in a more erect position than it is ultimately intended they should occupy. Thus in four or five years the tree will have acquired something the character of the third figure, and will go on thus increasing until the space is filled.

The half-fan is a combination of the two forms, but as regards pruning does not materially differ from the horizontal, as two opposite side branches are produced in succession upward till the space is filled, only they are not taken out so abruptly, but are allowed to rise at an acute angle and then to curve into the horizontal line.

In all the various forms of cordons, in horizontal training, and in fan and half-fan training, the pruning of the main branches when the form of the tree is worked out will vary in accordance with the kind of fruit under treatment. Thus in the peach, nectarine, apricot, plum, and cherry, which are commonly trained fan-fashion, the first two will have to be pruned so as to keep a succession of young annual shoots, these being their fruit-bearing wood. The others are generally pruned so as to combine a moderate supply of young wood with a greater or less number of fruit spurs. In the pear and apple the fruit is borne principally on spurs, and hence what is known as spur-pruning has to be adopted, the young shoots being all cut back nearly to their base, so as to cause fruit buds to evolve from the remaining eyes or buds. Cordons of apples and pears have to be similarly treated, but cordons of peaches and nectarines are pruned so as to provide the necessary annual succession of young bearing wood.

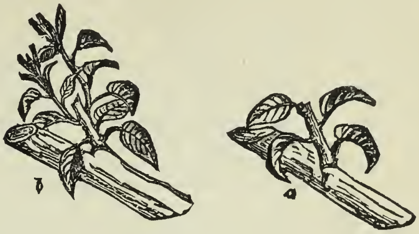
Cuts— Good and Bad.— The nature of the cut itself in pruning is of more consequence, especially in the case of fruit trees, than at first sight may appear. The branches should be separated by a clean cut at an angle of about 45°, just at the back of a bud, the cut entering on a level with the base of the bud and passing out on a level with its top (fig. *a*), for when cut in this way the wound becomes rapidly covered with new wood, as soon as growth recommences, whereas if the cut is too close the bud is starved, or if less close an ugly and awkward snag is left. Figs. *b* and *c* are examples of the former, and *d*, *e*, *f* of the latter.



Cuts—Good and Bad.

In the case of fruit trees, and indeed of deciduous plants generally, pruning requires to be done during the winter or resting period, and the earlier in that period the better, as then the buds become plump and full of sap, and produce strong shoots when the time for growth arrives. If, on the contrary, it is done while the plant is in full growth, the whole system of the tree sustains a check, the circulation is deranged, the quality of the sap becomes deteriorated, and a dead stump or unhealthy shoot is the frequent result. This, however, does not apply to the pruning of the herbaceous or succulent growths of the current season, nor to soft-wooded plants generally, for this kind of pruning, called summer pruning, is essential to the formation of handsome specimens of the latter, and is a very important help in the formation of the fruit or blossom buds of fruit trees.

Summer Pruning should be performed while the shoots are yet young and succulent, so that they may in most cases be nipped off with the thumb-nail It is very necessary in the case of trees trained to a flat surface, as a wall or espalier rail, to prevent undue crowding. In some cases, as, for example, with peaches, the superfluous shoots are wholly removed, and certain selected shoots reserved to supply bearing wood for next year. In others, as pears, the tops of the young shoots are removed, leaving three or four leaves and their buds at the base, to be developed into fruit buds by the additional nourishment thus thrown into them (fig. *a*). One or two may push out a late summer growth, *b;* this will serve as a vent for the vigor of the tree, and if the lowermost only go to the formation of a fruit spur, the object will have been gained. They are cut to the last dormant bud in winter.



Summer Pruning for Spurs.

But summer pruning has been much extended since the introduction of restricted growth and the use of dwarfing stocks. Orchard-house trees, and also pyramidal and bush trees of apples, pears and plums, are mainly fashioned by summer pruning; in fact, the less the knife is used upon them, except in the necessary cutting of the roots in potted trees, the better. In the case of orchard-house plants no shoots are suffered to lengthen out, except as occasionally wanted to fill up a gap in the outline of the tree. On the contrary, the tops of all young shoots are pinched off when some three or four leaves are formed, and this is done again and again throughout the season. When this pruning is just brought to a balance with the vigor of the roots, the consequence is that fruit buds are formed all over the tree, instead of a thicket of sterile and useless wood. Pyramidal and bush trees out of doors are, of course, suffered to become somewhat larger, and sufficient wood must be allowed to grow to give them the form desired; but after the first year or two, when the frame work is laid out, they are permitted to extend very slowly, and never to any great extent, while the young growths are continually nipped off, so as to clothe the branches with fruit buds as closely placed as will permit of their healthy development.

The *Pruning of Flowering Plants* is generally a much lighter matter than the pruning of fruit-trees. If a young seedling or cutting of any soft-wooded plant is to be bushy, it must have its top nipped out by the thumb-nail or pruning-scissors at a very early age, and this stopping must be repeated frequently. If what is called a well-furnished plant is required, an average of from two to three inches is all the extension that must be permitted—sometimes scarcely so much—before the top is nipped out; and this must be continued until the desired size is attained, whether that be large or small. Then generally the plant is allowed to grow away till bloom or blooming shoots are developed. To form a pyramidal plant, which is a very elegant and useful shape to give to a decorative pot plant, the main stem should be encouraged to grow upright, for a length perhaps of six or eight inches before it is topped; this induces the formation of laterals, and favors their development. The best-placed upper young shoot is selected and trained upright to a slender stake, and this also is topped when it has advanced six or eight inches further, in order to induce the laterals on the second portion to push freely. This process is continued till the required size is gained. With all the difficult and slow-growing plants of the hard-wooded section, all the pruning must be done in this gradual way in the young wood as the plant progresses.

Root Pruning is most commonly practiced in fruit-tree cultivation. It is often resorted to as a means of restoring fertility in plants which have become over-rank and sterile in growth. The effect of it, or of transplanting, is to reduce the supply of crude sap to the branches, and consequently to cause a check in their development. In root-pruning all roots that have struck downward into a cold, uncongenial subsoil must be pruned off if they cannot be turned in a lateral direction, and all the lateral ones that have become coarse and fiberless must also be shortened back by means of a clean cut with a sharp knife, while some hard rubbly material may if necessary be put under the tree before it is again planted, all its roots being laid out laterally, radiating as equally as possible from the center. The operation is best performed early in autumn, and may be safely resorted to in the case of fruit-trees of moderate age, and even of old trees if due care be exercised. In transplanting trees all the roots which may have become bruised or broken in the process of lifting should be cut clean away behind the broken part, as they then more readily strike out new roots from the cut parts. In all these cases the cut should be a clean sloping one, and made in an upward and outward direction.

The root-pruning of pot-plants is necessary in the case of many soft-wooded subjects which are grown on year after year—pelargoniums and fuchsias, for example. After the close pruning of the branches to which they are annually subjected, and when the young shoots have shot forth an inch or two in length, they are turned out of their pots and have the old soil shaken away from their roots, the longest of which, to the extent of about half the existing quantity, are then cut clean away, and the plants repotted into small pots. This permits the growing plant to be fed with nice fresh soil, without having been necessarily transferred to pots of unwieldy size by the time the flowering stage is reached.

Ringing.—One of the expedients for inducing a state of fruitfulness in trees is the ringing of the branches or stem, that is, removing a narrow annular portion of the bark, by which means, it is said, the trees are not only rendered productive, but the quality of the fruit is at the same time improved. The advantage depends on the obstruction given to the descent of the sap. The ring should be cut out in spring, and be of such a width that the bark may remain separated for the season. A tight ligature of twine or wire answers the same end. The advantages of the operation may perhaps be gained by judicious root-pruning, and it is not at all adapted for the various stone fruits.

26. *Training.*—What is called training is the guiding of the branches of a tree or plant in certain positions which they would not naturally assume, the object being partly to secure their full exposure to light, and partly to regulate the flow and distribution of the sap. To secure the former object, the branches must be so fixed as to shade each other as little as possible, and to realize the second, the branches must have given to them an upward or downward direction, as they may require to be encouraged or repressed. Something of the same vegetative vigor which is given to a plant or tree by hard pruning is afforded by training in an upward direction so as to promote the flow of the sap; while the repression effected by summer pruning is supplemented by downward training, which acts as a check. One main object is the preservation of the equilibrium in the growth of the several parts of the tree; and for this various minor details deserve attention. Thus a shoot will grow more vigorously while waving in the air than when nailed close to the wall; consequently a weak shoot should be left free, while its stronger antagonist should be restrained; and a luxuriant shoot may be retarded for some time by having its tender extremity pinched off to allow a weaker shoot to overtake it.

Mr. Robert Thompson, who is to be regarded as an authority, says:—

"A fair exposure to light is one of the principal objects to be borne in mind in training; but the branches may be well regulated as regards exposure to light, without being equally so with respect to the flow of sap. For instance, they may be disposed like the radii of a circle touching the circumference at equal distances (see illustration, *aa*, *bb*, *cc*, *v*). We shall, however, suppose that the central vertical shoot *v* has been cut back nearly to its base in order to furnish from buds there situated the rudiments of other branches. The sap flows with much greater force into the upright or nearly upright branches than it does into those having a horizontal position; therefore branches radiating at equal distances, like those in the figure, would soon become very unequal in point of vigor; *cc* would of course be strong, *aa* comparatively weak, while *bb* would maintain a somewhat intermediate condition. If, instead of training the shoots *cc* in a straight direction, we depress them at *dd* and bend them in the growing season as indicated by the curved line toward *bb*, we shall greatly check their over-luxuriance. On the other hand, by elevating the horizontal shoots at *ee*, and training them in the direction of the dotted line toward *bb*, those shoots will be thereby greatly invigorated. In short, by curving the upper branches downward and the lower ones upward, the flow of sap is checked in the former and promoted in the latter; and the consequence is that *aa* and *cc* are equal to the medium *bb* and to each other."

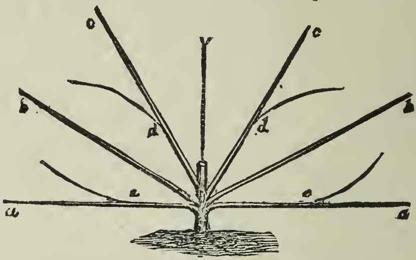


Diagram Illustrating Branch Distribution.

By these and other expedients, and by the prudent use of the knife, fruit-trees may be readily trained into the forms indicated below, which are among the best out of the many which have been devised.

The training of standard and bush trees in the open ground has been already referred to under the section *Pruning*. When the growth of pyramids is completed, the outline is something like that of illustration, and very pretty trees are thus formed. It is better, however, especially if the tendency to bear fruit is rather slack, to adopt what the French call *en quenouille* training, which consists in tying or weighting the tips of the branches so as to give them all a downward curve. Pear-trees worked on the quince stock, and trained *en quenouille*, are generally very fertile.

Wall-trees, it must be evident, are placed in a very unnatural and constrained position, and would in fact soon be reduced to a state of utter confusion, if allowed to grow unrestricted; hence the following modes of training have been adopted.

Horizontal Training has long been a favorite form in England. There is one principal ascending stem from which the branches depart at right angles, at intervals of about a foot. Horizontal training is best adapted to the apple and the pear; and for the more twiggy growing slender varieties, the forms shown in second cut on that subject have been recommended. In these the horizontal branches are placed wider, eighteen to twenty inches apart, and the smaller shoots are trained between them, either on both sides, as at *a*, or deflexed from the lower side, as at *b*. The latter is an excellent method of reclaiming neglected trees. Every alternate branch should be taken away, and the spurs cut off, after which the young shoots are trained in, and soon produce good fruit.

In *Fan Training* there is no leading stem, but the branches spring from the base and are arranged somewhat like the spokes of a fan. This mode of training is commonly adopted for the peach, nectarine, apricot, and Morello cherry, to which it is best adapted. Though sometimes adopted, it is not so well suited as the horizontal form for apples and pears, because, when the branches reach the top of the wall, where they must be cut short, a *tête de saule* or hedge of young shoots, is inevitable. A modification, of the fan shape is sometimes adopted for stone fruits, such as the apricot. In this the object is to establish a number of mother branches, and on these to form a series of subordinate members, chiefly composed of bearing wood. The mother branches or limbs should not be numerous, but well marked, equal in strength, and regularly disposed. The side branches should be pretty abundant, short, and not so vigorous as to rival the leading members.

The *Half-fan* mode of training, which is intermediate between horizontal and fan training, is most nearly allied to the former, but the branches leave the stem at at an acute angle, a disposition supposed to favor the more equal distribution of the sap. Sometimes two vertical stems are adopted, but there is no particular advantage in this, and a single-stemmed tree is more manageable. The half-fan form is well adapted for such fruits as the plum and the cherry; and, indeed, for fruits of vigorous habit, it seems to combine the advantages of both the foregoing.

Trees must be fixed to the walls and buildings against which they are trained by means of nails and shreds, or in cases where it is desired to preserve the wall surface intact, by permanent nails or studs driven in in regular order. Sometimes the walls are furnished with galvanized wires, but this has been objected to as causing cankering of the shoots, for which, however, painting is recommended as a remedy, and which is also avoided, it is said, by crossing the tying material between the wire and the wood, and so preventing them from coming in contact. If they are adopted, the wires should be close to the wall to prevent a cold draught between it and the tree. Care should be taken that the ties or fastenings do not eventually cut into the bark as the branches swell with increased age. When shreds and nails are used, cast wall nails and "medicated shreds" are the best; the nails should be of small size for the young shoots.

For tying plants to trellises and stakes nothing is better than soft tarred twine. Osier ties are sometimes used for espaliers. The training in of summer shoots on wall-trees is often done by means of slender twigs; indeed the prunings of the trees themselves, stripped of their leaves, often serve the purpose very well; the ends are tucked under the adjacent fixed shoots, the young shoots to be fastened in being thus held close to the wall. Crooked shoots should be straightened at the principal or winter training; this is done by pulling the convex side toward the straight line desired by means of the tie or shred, the next above and below being set so as to pull in the opposite direction.

In training greenhouse plants the young branches should be drawn outward by means of ties fastened to a string or wire under the pot-rim; the center then fills up, and slender stakes are used as required; but the fewer these are in number the better. Climbers are trained from the bottom around or across trellises, of which the cylindrical or the balloon-shaped, or sometimes the flat oval or circular, are the best forms. The size should be adapted to the habit of the plant, which should cover the whole by the time flowers are produced. Bast fiber and raphia fiber are to be preferred for light subjects of this character, as they can be split to any degree of fineness; but the latter is not durable enough or strong enough for coarse-growing border flowers. Very durable trellises for greenhouse climbers are made of slender round iron rods for standards, having a series of hooks on the inner edge, into which rings of similar metal are dropped; the rings may be graduated so as to form a broad open top, or may be all of the same size, when the trellis will assume the cylindrical form.

The training of bedding plants over the surface of the soil is done by small pegs of birch wood or bracken, by loops of wire, or sometimes by loops of bast having the ends fixed in the soil by the aid of the dibble. The object is to fill up the blank space as quickly and as evenly as possible.

27. *Forcing* is the accelerating, by special treatment, of the growth of certain plants, which are required to be had in leaf, in flower, or in fruit before their natural season — as, for instance, the leaves of mint at Eastertide or the leafstalks of sea-kale and rhubarb at Christmas, the flowers of summer in the depth of winter, or some of the choicest fruits perfected so much before their normal period as to complete, with the retarded crops of winter, the circle of the seasons.

There are some few subjects which when forced do not require a light house. Thus among flowers the white blossoms of the lilac, so much prized during winter, are produced by forcing the plant in darkness. Rhubarb and sea-kale among esculents both need to be forced in darkness to keep them crisp and tender, and mushrooms also are always grown in dark structures. In fact, a roomy mushroom house is one of the most convenient of all places for forcing the vegetables just referred to. The lilac would be better placed in a dark shed heated to about 60°, in which some dung and leaves could be allowed to lie and ferment, giving off both a genial heat and moisture.

One of the most important preliminaries to successful forcing is the securing to the plants a previous state of rest. The thorough ripening of the preceding season's wood in fruit trees and flowering plants, and of the crown in perennial herbs like strawberries, and the cessation of all active growth before the time they are to start into new growth, are of paramount importance. The ripening process must be brought about by free exposure to light, and by the application of a little extra heat with dryness, if the season should be unfavorable; and both roots and tops must submit to a limitation of their water supply. When the ripening is perfected, the resting process must be aided by keeping the temperature in which they await the forcing process as low as each particular subject can bear.

V. Flowers.

28. *Flower Garden and Pleasure Grounds.*—Wherever there is a flower garden of considerable magnitude, and in a separate situation, it should be constructed on principles of its own. The great object must be to exhibit to advantage the graceful forms and glorious hues of flowering plants and shrubs.

When the garden is upon a large scale, and especially where a natural inclination of the ground exists, or car be formed artificially, terraces and parapet walls should be introduced, with flights of steps, and embellishments in connection with them, such as fountains, statuary, sculpture, etc. Grass terraces alone have a mean appearance in such a position. The parapet walls afford excellent accommodation for half-hardy and beautiful flowering plants.

With regard to flower-plots, when the figures are separated by turf, it is necessary that the little lawns or glades should have a certain degree of breadth, as nothing has a worse effect than overcrowding. A multitude of little figures should also be avoided, as they produce the disagreeable effect well named by Gilpin "spottiness." In this sort of flower garden it is desirable that a gravel walk should skirt at least one side of the principal figures, for in a humid climate the grass would otherwise render them inaccessible with comfort during a great part of the year. In those gardens where turf is wholly or partly excluded, the compartments should be of a larger and more massive character. Narrow borders, bounded by parallel straight lines and concentric curves, should be avoided. The centers of the figures should be filled with tall-growing shrubs, and even with an occasional low evergreen tree, such as a yew or a holly. The walks, arranged in long concave curves, may communicate here and there with one another. A dial, a few seats and arbors, with an urn or two or a vase, may be introduced with good effect.

29. *Fruits Important to Man.*—The list of the fruits of any importance is much shorter than would at first be supposed, as may be seen from the following enumeration.

I. *Indigenous or Cultivated:* (1) *Apples or Pip-fruits.*—Apple (*Pyrus Malus*), Pear (*P. communis*), Medlar (*Mespilus germanica*), Quince (*Cydonia vulgaris*).

(2) *Stone-fruit.*—Peach and Nectarine (*Persica vulgaris*), Apricot (*Prunus armeniaca*), Plum (*P. insititia*), Cherry (*P. Cerasus* and *P. avium*), Damson (*P. domestica*), Greengage (*P. italica*), Sloe (*P. spinosa*) Cherry-plum (*P. cerasifera*), etc.

(3) *Berries.*—Grape (*Vitis vinifera*), Strawberry (*Fragaria vesca, elatior*, etc.), Raspberry (*Rubus Idæus*), Bramble or Blackberry (*R. fruticosus*), Gooseberry (*Ribes Grossularia*), Red Currant (*R. rubrum*), Black Currant (*R. nigrum*), Barberry (*Berberis vulgaris*), Black Mulberry (*Morus nigra*), White Mulberry (*M. alba*), Bilberry or Blaeberry (*Vaccinium Myrtillus*) with its minor congeners, Juniper (*Juniperus communis*).

(4) *Nuts or Shell-fruit.* — Hazel-nut (*Corylus Avellana*), Filbert (*C. tubulosa*), Walnut (*Juglans regia*).

II. *More Important Fruits of Warm, Temperate, and Tropical Regions:* (1) *Stone-fruit.* — Date (*Phœnix dactylifera*), Olive (*Olea europæa*), Mango (*Mangifera indica*), Tahiti-apple (*Spondias dulcis*), Mombin Plum of West Indies (*S. Mombin*), Avocado Pear (*Persea gratissima*), Icaco or Cocoa Plum (*Chrysobalanus icaco*), Sapota Apple (*Achras Sapota*).

(2) *Berries and Berry-like Fruit* (in widest sense of succulence).—Banana and Plantain (*Musa paradisiaca*), Pine-apple (*Ananassa sativa*), Fig (*Ficus Carica*), Bread-fruit (*Artocarpus incisa* and *integrifolia*), Custard Apple (*Anona squamosa*, etc.), Baobab (*Adansonia digitata*), Orange, Lemon, Lime, Citron, Shaddock, Pompelmoose, Forbidden Fruit, Bergamot, and other species of *Citrus*, Pomegranate (*Punica granatum*), Guava (*Psidium piriferum*), Rose-apple of East Indies, (*Jambosa domestica* and *vulgaris*), Tamarind (*Tamarindus indica*), Carob or Locust Bean (*Ceratonia siliqua*), Papaw (*Carica Papaya*), Pumpkin (*Cucurbita Pepo*, etc.), Melon (*Cucumis Melo*), Water-melon (*C. Citrullus*), Cucumber (*C. sativus*), Tomato (*Lycopersicum esculentum*), Lotus (*Diospyros lotus*), Jujube (*Zizyphus vulgaris*), Mangosteen (*Garcinia Mangostana*), Prickly Pear (*Opuntia vulgaris*).

(3) *Nuts or Shell-fruit.*—Cocoa-nut (*Cocos nucifera*), Almond (*Amygdalus communis*), Chestnut (*Castanea vesca*), Litchi or Lee-Chee (*Nephelium Litchi*), (really however, a shelled drupe), Brazil-nut (*Bertholletia excelsa*), etc.

Chemical Composition of Fruits.—Our knowledge of the chemistry of fruit may be dated from the analyses of Fresenius (1857). But because of the innumerable varieties of almost every cultivated fruit, the effects of different soils and climates upon these, and still more of the fluctuation due to better or worse seasons, the results of any one chemical analysis would tend to convey an idea of undue precision. Thus *e. g.*, while the ratio of sugar to free acid in certain grapes of an ordinary wine-year was found to be 16 to 18, in a very bad year it sank to 12, and in a very good year rose to 24. Hence a broad outline may be of more general use than the statistics of any one analysis.

The percentage of water may be taken as varying from 78 to 80 in the grape and cherry, as from 82 to 85 in plums, peaches, apples, and pears, as 82 to 87 in brambles, currants, etc., and as much as 95 in the water-melon. The proportion of insoluble residue—skin and cellulose, stone and seed—obviously also varies greatly with succulence and ripeness, but may be taken, one fruit with another, at not less than from 4 to 6 per cent. Unripe fruits may contain a notable proportion of starch, but this is fermented on ripening into glucose and other sugars, fruit-sugar, grape-sugar, cane-sugar, or (in *Sorbus*) sorbin. The only fruits which retain starch in important quantity are those of the banana, bread-fruit tree, and baobab; hence the exceptional nutritive value of these. The olive alone yields a notable proportion of oil. The proportion of sugars varies exceedingly, dates, dry figs (48 per cent.), and raisins (56 per cent.), again very important foods, heading the list. Grapes of course stand high, from 12 to 18, indeed sometimes as much as 26 per cent., cherries from 8 to 13 apples 6 to 8, pears 7 to 8, plums 6, red currants 4.75, greengage 3.5, peach and apricot only 1.5. The proportion of pectin bodies is, however, exceedingly notable, especially in fruits such as the three last named. In unripe fruits (as also in roots) we find *pectose*, a body apparently related to cellulose, but easily transmuted by a natural ferment or by boiling with dilute acid into pectin, $C_4H_6O_4$, and its allies. These are all more or less soluble in water, with which they readily form a jelly (whence the peculiar consistency of our fruit-preserves). The proportion of soluble pectin and gum varies considerably and is of great importance to the blandness and agreeableness of fruit, the harder and more common apples having considerably less than 3 per cent. and the best rennets nearly 8. The harsh red currant, indeed, like berries in general, has exceedingly little (0.25 per cent.); while the apricot has as much as 9, the greengage 12, and the peach 16—a circumstance which explains the peculiarly melting quality of these fruits, especially the last named. The free acid also varies greatly, from 2.4 per cent. in the red currant, 1.4 in the raspberry, and nearly as much in the sourest cherries, to 0.5 in sweet cherries and a minimum of 0.1 or less in the sweetest pears. That of apples and of grapes, of course, varies greatly, but both may generally be taken at from 1 to 0.75, while the apricot and peach stand at 0.3 or 0.4. The acid is primarily malic, but citric, acetic, oxalic, tannic, and others may also be present.

The quantity of albuminoids is of course small, in fact inadequate to render most fruits a staple food. Yet it is by no means inappreciable, ranging from nearly .5 per cent. in the majority of fruits to .7 or .8 in the grape (2.7 in raisins), and above 1 in the melon and tomato. The quality of fruits depends largely upon the proportion of sugar, gum, and pectin to free acid, largely also upon the proportion of soluble to insoluble matters, but in very great measure also upon the aroma. This quality is due to the presence of characteristic ethers, often accompanied by essential oils.

VI. *Fruits.*

30. *Fruit-Tree Borders.*—No pains should be spared, in the preparation of fruit-tree borders, to secure their thorough drainage. The soil is sometimes placed upon a pavement flooring supported by stone or brick piers, with a cavity below of eighteen inches or two feet deep, into which air is admitted by small vertical eyes, placed along the edges of the walk, and covered with open iron gratings. This arrangement is expensive, and the same advantages can generally be secured by placing over the sloping bottom a good layer of coarse rubbly material, communicating with a drain in front to carry off the water, while earthenware drain tubes may be laid beneath the rubble from eight to ten feet apart, so as to form air drains, and provided with openings both at the side of the walk and also near the base of the wall. Over this rubbly matter, rough turfy soil, grass side downward, should be laid, and on this the good prepared soil in which the trees are to be planted. Such an elaborate system of drainage is necessary only in the case of adhesive clayey subsoils.

The borders should consist of three parts rich, turfy, calcareous loam, the top spit of a pasture, and one part light gritty earth, such as road-grit, with a small portion (one-sixth) of fine lime and brick rubbish. They should not be less than twelve feet in breadth, and may vary up to fifteen or eighteen feet, with a fall from the wall of about one inch in three feet. The border itself should be raised a foot or more above the general level. The bottom of the border, as well as that of the drain, must be kept lower than the general level of the subsoil, else the soakage will gather in all the little depressions of its surface. Fruit-tree borders should not be at all cropped with culinary vegetables, or very slightly so, as the process of digging destroys the roots of the trees, and drives them from near the surface, where they ought to be.

Shallow planting, whether of wall-trees or standards, is generally to be preferred, a covering of a few inches of soil being sufficient for the roots, but a surface of at least equal size to the surface of the hole should be covered with dung or litter so as to restrain evaporation and preserve moisture. In the case of wall-trees, a space of five or six inches is usually left between the stem at the insertion of the roots and the wall, to allow for increase of girth. Young standard trees should be tied to stakes so as to prevent their roots being ruptured by the wind-waving of the stems.

In the selection and distribution of fruit-trees regard must, of course, be had to local situation and climate. The best walls having a south or southeast aspect are devoted to the peach, apricot, and fig. Cherries and the generality of plums succeed very well either on an east or west aspect. In Scotland the mulberry requires the protection of a wall, and several of the finer apples and pears do not arrive at perfection without this help, and a tolerably good aspect. The wall-trees intended to be permanent are called dwarfs, from their branches springing from near the ground. Between these, trees with tall stems, called riders, are planted as temporary occupants of the upper part of the wall. The riders should have been trained in the nursery into good-sized trees, in order that when planted out they may come into bearing as speedily as possible.

Standard Fruit-Trees should not be planted, if it can be avoided, in the borders of the kitchen garden, but in the outer slips, where they either may be allowed to attain their full size, or may be kept dwarfed. Each sort of fruit should be planted by itself, for the sake of orderly arrangement, and in order to facilitate protection when necessary by a covering of nets. Their produce is often superior in flavor to that of the same kind of fruit grown on walls.

VIII. *Vegetables.*

31. The list of vegetables is so long and the cultivation of the various species involves so many operations and requires so much technical knowledge, that our space will not permit us to do more than append a calendar of gardening seasons, including among other information the best times at which to begin the cultivation of the various kinds of plants included under that head. In addition we give a list of the less known "pot herbs," together with a brief description of their appearance and uses.

32. *CALENDAR FOR THE UNITED STATES (chiefly for the Latitude of New York).*

JANUARY.

Flower Garden and Greenhouse. — Little is to be done in either. In the greenhouse care must be used to protect against frost. Ventilate but little, and with care; raise the ventilating sash only high enough to let the heated air from the greenhouse drive back the outer air so as not to chill the plants. To destroy the red spider, syringe the plants copiously at night, and splash the paths with water. The aphis, or "green fly," must also be destroyed; tobacco may be used. At this season, roses, grapevines, and other plants are often affected by mildew; an effectual remedy is to paint the hot-water pipes with a mixture of sulphur and lime, put on as thick as ordinary whitewash, once each week until it is checked; but care must be taken not to apply it on any surface at a higher temperature than 212°. Hyacinths and other bulbs that have been kept in a cellar or other dark, cool place may now be brought into the light of the greenhouse or sitting-room, provided they have filled the pots with roots. If they are not well rooted, leave them until they are, or select such of them as are best, leaving the others. In the outside flower garden little can be done, except that shrubs may be pruned, or new work, such as making walks or grading, performed, if weather permits.

Fruit Garden. — Pruning, staking up, or mulching can be done if the weather is such that the workmen can stand out. No plant is injured by being pruned in cold weather.

Grapery. — Graperies used for the forcing of foreign grapes may be started, beginning at a temperature of 50° at night, with 10° or 15° higher during the day. The borders must be covered sufficiently deep with leaves or manure to prevent the soil from freezing, as it would be destruction to the vines to start the shoots if the roots were frozen; hence, when forcing is begun in January, the covering should be put on in November, before severe frosts begin.

Vegetable Garden.— But little can be done in the Northern States, except to prepare manure, and get sashes, tools, etc., in working order; but in sections of the country where there is little or no frost the hardier kinds of seeds and plants may be sown and planted, such as asparagus, cabbage, cauliflower, carrot, leek, lettuce, onion, parsnip, peas, spinach, turnip, etc. In any section where these seeds can be sown in open ground, it is an indication that hotbeds may be started for the sowing of such tender vegetables as tomatoes, egg and pepper plants, etc., though, unless in the extreme Southern States, hotbeds should not be started before the beginning or middle of February.

FEBRUARY.

Flower Garden and Greenhouse.— The directions for January will in the main apply to this month, except that now some of the hardier annuals may be sown in hotbed or greenhouse, and also the propagation of plants by cuttings may be done rather better now than in January, as the greater amount of light gives more vitality to the cutting.

Fruit Garden.— But little can be done in most of the Northern States as yet, and in sections where there is no frost in the ground it is likely to be too wet to work; but in many Southern States this will be the best month for planting fruit-trees and plants of all kinds, particularly strawberries, raspberries, blackberries, pear and apple trees, while grapevines will do, though they will also do well quite a month later.

Grapery. — The graperies started last month at 50° at night may now be increased to 60°, with a correspondingly higher day temperature. Great care must be taken to syringe the leaves thoroughly at least once a day, and to deluge the paths with water, so as to produce a moist atmosphere. Paint the hot-water pipes with sulphur mixture, as recommended in January.

Vegetable Garden. — Leaves from the woods, house manure, or refuse hops from breweries may be got together toward the latter part of this month, and mixed and turned to get "sweetened" preparatory to forming hotbeds. Cabbage, lettuce, and cauliflower seeds, if sown early this month in hotbed or greenhouse, will make fine plants if transplanted into hotbed in March. This is preferable to the use of fall-sown plants. Manure that is to be used for the crop should be broken up as fine as possible, for the more completely manure of any kind can be mixed with the soil the better the crop will be, and, of course, if it is dug or plowed in in large unbroken lumps it cannot be properly commingled.

MARCH.

Flower Garden and Greenhouse.—The long days and bright sunshine will now begin to tell on the plants under glass. Examine all plants that are vigorous and healthy; if the roots have matted the "ball" of earth they must be shifted into a larger-sized pot. Plants from cuttings struck last month may now be shifted and the propagation of all plants that are likely to be wanted should be continued. Hardier kinds of annuals may be sown; it is best done in shallow boxes, say two inches deep. Lawns can be raked off and mulched with short manure, or rich garden earth where manure cannot be obtained. Flower beds on light soil may be dug up so as to forward the work of the coming busy spring season.

Fruit Garden.—In many sections, planting may now be done with safety, provided the soil is light and dry, but not otherwise. Again, at this season, although a tree or plant will receive no injury when its roots are undisturbed in the soil should a frost come after planting, the same amount of freezing will and very often does greatly injure the plant if the roots are exposed.

Grapery.—The grapery started in January will have set its fruit, which should be thinned by one-third. The temperature may now be further advanced to 70° at night, with 15° higher in the daytime. The same precautions must be used against mildew and insects as given in January. Graperies wanted for succession may be started in February or this month.

Vegetable Garden.—This is a busy month. In localities where the frost is out of the ground, if it is not wet, seeds of the hardier vegetables can be sown. The list of seeds given for the Southern States in January may now be used at the North, while for most of the Southern States tender vegetables, such as egg plant okra, sweet potatoes, melon, squash, potatoes, tomatoes, etc., may be sown and planted. Hotbeds must now be all started.

APRIL.

Flower Garden and Greenhouse.—Window and greenhouse plants require more water and ventilation. Due attention must be paid to shifting well-rooted plants into larger pots; and, if space is desired, many kinds of hardier plants can be safely put out in cold frames. Toward the end of the month it may be necessary to slightly shade the glass of the greenhouse. All herbaceous plants and hardy shrubs may be planted in the garden. The covering of leaves or litter should be taken off bulbs and tender plants that were covered up for winter, so that the beds can be lightly forked and raked. Sow tender annual flower seeds in boxes inside.

Fruit Garden.—Strawberries that have been covered up with straw or leaves should be relieved around the plants, leaving the covering between them. Raspberries, grapevines, etc., that have been laid down may now be uncovered and tied up to stakes or trellises, and all new plantations of these and other fruits may now be made.

Vegetable Garden. — Asparagus, rhubarb, spinach, etc., should be uncovered, and the beds hoed or dug lightly. Hardier sorts of vegetable seeds and plants such as beets, cabbage, cauliflower, celery, lettuce, onions, parsley, parsnip, peas, potatoes, radishes, spinach, turnip, etc., should all be sown or planted by the middle of the month if the soil is dry and warm, and, in all cases where practicable, before the end of the month. It is essential, in sowing seeds now, that they be well firmed in the soil. Any who expect to get early cabbage, cauliflower, lettuce or radishes, while planting or sowing is delayed until the time of sowing tomato and egg plant in May, are sure to be disappointed of a full crop.

MAY.

Flower Garden and Greenhouse.—Window and greenhouse plants should be in their finest bloom. Firing may be entirely dispensed with, though care must still be exercised in ventilating. Every precaution must be used to keep the air moist. "Moss culture" may be tried, the common sphagnum of moss of the swamps, mixed with one-twentieth of its bulk of bonedust, being laid as a mulch on the top of the earth of the flower-pots; its effect is to shield the pots from the sun, and at the same time stimulate the roots to come to the surface. By the end of the month all of the plants that are wanted for the summer decoration of the flower border may be planted out, first loosening a little the ball of earth at the roots. If the weather is dry, water freely after planting. When the greenhouse is not to be used during the summer months, camellias, azaleas, and plants of that character should be set out of doors under partial shade, but most of the other plants usually grown in the conservatory or window garden in winter may be set in the open border. Flower beds should be kept well hoed and raked, to prevent the growth of weeds next month. Lawns should be mown, and the edgings trimmed. Pelargoniums, pinks, monthly roses, and all the half-hardy kinds of flowering plants should be planted early; but coleus, heliotrope, and the more tender plants should be delayed until the end of the month. Annuals that have been sown in the greenhouse or hotbed may be planted out, and seeds of such sorts as mignonette, sweet alyssum, phlox Drummondii, portulaca, etc., may be sown in the beds or borders.

Fruit Garden.—The hay or leaf mulching on the strawberry beds should be removed and the ground deeply hoed, after which it may be placed on again to keep the fruit clean and the ground from drying. Where it has not been convenient before, most of the smaller fruits may yet be planted during the first part of the month. Tobacco dust will dislodge most of the numerous kinds of slugs, caterpillars, or worms that make their appearance on the young shoots of vines or trees.

Vegetable Garden.—Attention should be given to new sowings and plantings for succession. Crops sown last month will have to be thinned out if large enough. Hoe deeply all transplanted crops, such as cabbage, cauliflower, lettuce, etc. Tender vegetables, such as tomatoes, egg and pepper plants, sweet potatoes, etc., can be planted out. Seeds of Lima beans, sweet corn, melon, okra, cucumbers, etc., should be sown; and sow for succession peas, spinach, lettuce, beans, radishes, etc., every ten days.

JUNE.

Flower Garden and Greenhouse.— Tropical plants can now be used to fill up the greenhouse during the summer months. It should be well shaded, and fine specimens of fancy caladiums, dracænas, coleus, crotons, palms, ferns and such plants as are grown for the beauty of their foliage will make a very attractive show. The "moss culture" will be found particularly valuable for these plants. Hyacinths, tulips, and other spring bulbs may be dug up, dried, and placed away for next fall's planting, and their places filled with bedding plants, such as coleus, achyranthes, pelargoniums, and the various white and colored leaf plants. It will be necessary to mow the lawn once a week.

Fruit Garden.— The small fruits should be mulched about the roots, if this has not yet been done. Grapevines outside as well as in should be disbudded.

Vegetable Garden.— Beets, beans, carrots, corn, cucumbers, lettuce, peas, and radishes may be sown for succession. This is usually a busy month, as many crops have to be gathered, and, if hoeing is not promptly seen to, weeds are certain to give great trouble. Tomatoes should be tied up to trellises or stakes if fine-flavored and handsome fruit is desired, for if left to ripen on the ground, they are apt to have a gross earthy flavor.

JULY.

Flower Garden and Greenhouse.—Watering, ventilating, and fumigating (or the use of tobacco in other forms for destruction of aphides) must be attended to. The atmosphere of the greenhouse must be kept moist. Watch the plants that have been plunged out of doors, and see if they require repotting. All plants that require staking, such as dahlias, roses, gladioli, and many herbaceous plants, should now be looked to. Carnations and other plants that are throwing up flower stems, if wanted to flower in winter, should be cut back, that is, the flower stems should be cut off to say five inches from the ground.

Fruit Garden—If grapevines show any signs of mildew, dust them over with dry sulphur, selecting a still, warm day. The fruit having now been gathered from the strawberry plants, if new beds are to be formed, the system of layering the plants in small pots is the best. Where apples, pears, peaches, grapes etc., have set fruit thickly, thin out at least one-half or two-thirds of the young fruit.

Vegetable Garden.—The first days of this month will yet be time enough to sow sweet corn, beets, lettuce, beans, cucumbers, and ruta-baga turnips. Such vegetables as cabbage, cauliflower, celery, etc., wanted for fall or winter use, are best planted this month, though in some sections they will do later. Keep sweet potatoes hoed to prevent the vines rooting at the joints.

AUGUST.

Flower Garden and Greenhouse.—But little deviation is required in these departments from the instructions for July.

Fruit Garden.—Strawberries that have fruited will now be making "runners" or young plants. These should be kept cut close to the old plant, so that the full force of the root is expended in making the "crowns" or fruit buds for next season's crop. If plants are required for new beds, only the required number should be allowed to grow, and these should be layered in pots as recommended in July. The old stems of raspberries and blackberries that have borne fruit should be cut away, and the young shoots thinned to three or four canes to each hill or plant. If tied to stakes and topped when four or five feet high, they will form three or four branches on a cane, and will make stronger fruiting plants for next year.

Vegetable Garden.—Hoe deeply such crops as cabbage, cauliflower, and celery. The earthing up of celery this month is not to be recommended. Onions in many sections can be harvested. The proper condition is when the tops are turning yellow and falling down. They are dried best by placing them in a dry shed in thin layers. Sow spinach for fall use, but not yet for the winter crop. Redtop, white globe, and yellow Aberdeen turnips should now be sown; ruta-baga turnips sown last month will need thinning, and in extreme Southern States they may yet be sown.

SEPTEMBER.

Flower Garden and Greenhouse.—The flower beds in the lawn should be at their best. If planted in "ribbon lines" or "masses," strict attention must be given to pinching off the tops, so that the lines or masses will present an even surface. Tender plants will require to be put in the greenhouse or housed in some way toward the end of this month; but be careful to keep them as cool as possible during the day. Cuttings of bedding plants may now be made freely if wanted for next season, as young cuttings rooted in the fall make better plants for next spring's use than old plants, in the case of such soft-wooded plants as pelargoniums, fuchsias, verbenas, heliotropes, etc.; with roses and plants of a woody nature, however, the old plants usually do best. Dutch bulbs, such as hyacinths, tulips, crocus, etc., and most of the varieties of lilies, may be planted. Violets that are wanted for winter flowering will now be growing freely, and the runners should be trimmed off. Sow seeds of sweet alyssum, candytuft, daisies, mignonette, pansies, etc.

Fruit Garden.—Strawberry plants that have been layered in pots may yet be planted, or in southern districts the ordinary ground layers can be planted. The sooner in the month both are planted the better crop they will give next season; and, as these plants soon make runners, it will be necessary to trim them off. Attend to raspberries and blackberries as advised for last month, if they have not already been attended to.

Vegetable Garden.—If cabbage, cauliflower, and lettuce are wanted to plant in cold frames, the seed should be sown from about the tenth to the twentieth of this month; but judgment should be exercised, for, if sown too early, cabbage and cauliflower are apt to run to seed. The best date for latitude of New York is September 15th. The main crop of spinach or sprouts that is wanted for winter or spring use should be sown about the same date. The earth should be drawn up to the celery with a hoe preparatory to earthing up with a spade. Onions that were not harvested and dried last month must now be attended to. Turnips of the early or flat sorts may yet be sown the first week of this month in the Northern States, and in the South from two to four weeks later.

OCTOBER.

Flower Garden and Greenhouse.—In northern sections of the United States, tender plants that are still outside should be got under cover as early as possible. Delay using fire heat as long as possible, unless the nights become so cold as to chill the plants inside the house. Roses, carnations, camellias, azaleas, pelargoniums, and the hardier sorts of plants will do better if placed in a cold frame or pit until the middle of November than they would in an ordinary greenhouse. Look out for insects. Fall bulbs of all kinds may be planted. Take up summer-flowering bulbs and tubers, such as dahlias, tuberoses, gladioli, cannas, caladiums, tigridias, and dry them off thoroughly, stowing them away afterward in some place free from frost and moisture during winter.

Fruit Garden.—Strawberries that have been grown from pot-grown layers may yet be planted in Southern States; keep the runners trimmed off. Fruit-trees and shrubs may be set out; but, if planting is deferred to the last of the month, the ground around the roots should be mulched to the thickness of three or four inches with straw, leaves, or rough manure, as a protection against frost.

Vegetable Garden.—Celery will now be in full growth, and will require close attention to earthing up, and during the last part of the month the first lot may be stored away in trenches for winter. All vegetable roots not designed to be left in the ground during the winter should be dug up, such as beets, carrots, parsnips, sweet potatoes, etc. The cabbage, cauliflower, and lettuce plants grown from seed sown last month should be pricked out in cold frames. If lettuce is wanted for winter use, it may now be planted in the greenhouse or cold frame, and will be ready for use about Christmas. If asparagus or rhubarb is wanted for winter use, it should be taken up and stowed away in pit, frame, shed, or cellar for a month or two. It may then be taken into the greenhouse and packed closely together under the stage, and will be fit for use from January to March, according to the temperature of the house.

NOVEMBER.

Flower Garden and Greenhouse.—Plants intended to be grown inside should now all be indoors. Keep a sharp lookout for cold snaps, as they come very unexpectedly in November, and many plants are lost thereby. In cases where it is not convenient to use fire heat, 5° to 10° of cold can be resisted by covering the plants over with paper, and by using this before frost has struck the plants valuable collections may be saved. When fire heat is freely used, be careful to keep up the proper amount of moisture by sprinkling the paths with water. Little can be done in the flower garden, except to clean off all dead stalks, and straw up tender roses, vines, etc., and, wherever there is time, to dig up and rake the borders, as it will greatly facilitate spring work. Cover up all beds in which there are hyacinths, tulips, and other bulbs with a litter of leaves or straw to the depth of two or three inches If short, thoroughly decayed manure can be spared, a good sprinkling spread over the lawn will help it to a finer growth next spring.

Fruit Garden.—Strawberry beds should be covered (in cold sections) with hay, straw, or leaf mulching, to a depth not exceeding two inches. Fruit-trees and grapevines generally should be pruned; and, if the wood of the vine is wanted for cuttings, or scions of fruit-trees for grafts, they should be tied in small bundles and buried in the ground until spring.

Vegetable Garden.—Celery that is to be stored for winter use should be put away before the end of the month in all sections north of Virginia; south of that it may be left in most places where grown throughout the winter if well covered up. The stalks of the asparagus bed should be cut off, and burned if there are berries on them, as the seeds scattered in the soil sometimes produce troublesome weeds. Mulch the beds with two or three inches of rough manure. All vegetable roots that are yet in the ground, and not designed to be left there over winter, must be dug up in this latitude before the middle of the month, or they may be frozen in. Cover up onions, spinach, sprouts, cabbage, or lettuce plants with a covering of two or three inches of leaves, hay, or straw, to protect them during the winter. Cabbages that have headed may usually be preserved against injury by frost until the middle of next month, by simply piling them up and packing them closely in a dry spot in the open field with the heads down and roots up. On approach of cold weather in December they should be covered up with leaves as high as the tops of the roots, or, if the soil is light, it may be thrown over them, if leaves are not convenient. Cabbages will keep this way until March if the covering has not been put on too early. Plow all empty ground if practicable, and, whenever time will permit, do trenching and subsoiling. Cabbage, cauliflower, and lettuce plants that are in frames should be regularly ventilated by lifting the sash on warm days, and on the approach of very cold weather they should be covered with straw mats or shutters. In the colder latitudes, and even in the Middle States, it is absolutely necessary to protect cauliflower in this way, as it is much more tender than cabbage and lettuce plants.

DECEMBER.

Flower Garden and Greenhouse.—Close attention must be paid to protecting all tender plants, for it is not uncommon to have the care of a whole year spoiled by one night's neglect. Vigilance and extra hot fires will have to be kept up when the thermometer falls to 34° or 35° in the parlor or conservatory. It is well to set the plants under the benches or on the walks of the greenhouse; if they are in the parlor move them away from the cold point and protect them with paper; this will usually save them even if the thermometer falls to 24° or 26°. Another plan in the greenhouse is to dash water on the pipes or flues, which causes steam to rise to the glass and freeze there, stopping up all the crevices. With plants outside that require strawing up or to be mulched, this will have now to be finished.

Fruit Garden.—In sections where it is an advantage to protect grapevines, raspberries, etc., from severe frost, these should be laid down as close to the ground as possible, and covered with leaves, straw, or hay, or with a few inches of soil.

Vegetable Garden.—Celery in trenches should receive the final covering for the winter, which is best done by leaves or light stable litter; in the latitude of New York it should not be less than twelve inches thick. Potatoes, beets, turnips, or other roots in pits, the spinach crop in the ground, or any other article in need of protection, should be attended to before the end of the month; manure and compost heaps should be forwarded as rapidly as possible, and turned and mixed so as to be in proper condition for spring. Remove the snow that accumulates on cold frames or other glass structures, particularly if the soil which the glass covers was not frozen before the snow fell; it may remain on the sashes longer if the plants are frozen in, since they are dormant, and would not be injured if deprived of light for eight or ten days. If roots have been placed in cellars, attention must be given to ventilation, which can be done by making a wooden box, say six by eight inches, to run from the ceiling of the cellar to the eaves of the building above.

33. Culinary Herbs.— Besides the esculent and salad plants, there are several minor herbs used for flavoring and garnishing. For the most part they are dwarf perennial plants requiring to be grown on a dry, warm soil in an open, sunny aspect, or annuals for which a warm sheltered border is the most suitable place; and they may therefore be conveniently grown together in the same compartment — an herb garden. The perennials should be transplanted either every year or every second year.

For winter use the tops of the most useful kinds of herbs should be cut when in flower or full leaf and quite dry, and spread out in an airy but shady place so as to part slowly with the moisture they contain, and at the same time retain their aromatic properties. When quite dry they should be put into dry, wide-mouthed bottles, and kept closely corked. In this way such herbs as basil, marjoram, mint, sage, savory, and thyme of the aromatic class, balm, chamomile, horehound, hyssop, and the rue of the medicinal class, as well as parsley, may be had throughout the season with almost the full flavor of the fresh herb.

Angelica, Archangelica officinalis.— A stout biennial umbellifer; sow in April, in deep rich soil. The stems and leafstalks are candied.

Anise, Pimpinella Anisum.— A slender umbelliferous annual; sow in May in light, warm soil; English summers are scarcely warm enough to bring it to perfection.

Balm, Melissa officinalis.— A hardy labiate perennial; divide the roots in October; dry for winter use.

Basil, Ocymum Basilicum.— A fragrant labiate annual; sow in a gentle heat in March, and plant out on a warm border; or sow in a warm sheltered place in April or May; or in winter sow in heat (65°–70°) in pots or boxes in rich, light soil, once a month from November onward; that sown in April or May should be cut when in blossom, and dried slowly for winter use.

Borage, Borago officinalis.— A stout native British annual, used for garnishing; sow in March and May in an open place, in good soil.

Burnet, Poterium Sanguisorba.—A hardy native perennial; divide the roots in October or February. It tastes like cucumber.

Caraway, Carum Carui.— A hardy umbelliferous biennial; sow in April or May to flower the following summer.

Chamomile, Anthemis nobilis.— A hardy native British composite perennial of prostrate habit; divide the plants in autumn or spring, planting in rather poor, dry soil; the flowerheads should be gathered successively as they open, and carefully dried and stored.

Chervil, Anthriscus Cerefolium.—A hardy annual umbellifer; sow in March, and again in October if required for spring use.

Coriander, Coriandrum sativum.— A hardy annual umbellifer; sow in March in light loamy soil.

Dill, Anethum graveolens.—A hardy annual umbellifer; sow in March on a warm border, in rich, light soil.

Fennel, Fœniculum vulgare.—A hardy perennial umbellifer; sow in March or divide the roots at the same season.

Finochio, Fœniculum dulce.— A somewhat tender kind of fennel, with two-ranked leaves, fleshy at the base, which part is blanched by earthing up like celery; sow in March and successionally if required, in light, very rich soil.

Horehound, Marrubium vulgare. — A hardy native labiate perennial, best raised annually from seeds sown early in March, or by selecting self-sown autumn seedlings.

Hyssop, Hyssopus officinalis. — A hardy evergreen suffruticose labiate plant; sow in March or April, young plants being more vigorous than older ones; it may also be divided in spring.

Lavender, Lavendula vera.— An aromatic undershrub of the labiate order, requiring a light, warm, dry soil, and increased by cuttings, or by slips taken off with roots about March or April.

Marigold, Calendula officinalis.— A hardy composite annual; sow in March, in any garden soil.

Marjoram, Origanum Majorana.— A tender labiate, usually treated as an annual, and known as Knotted Marjoram; sow in March in a slight heat, and plant out on a warm, sunny border. The *Pot Marjoram,* Origanum Onites, and ***Winter Sweet Marjoram,*** Origanum heracleoticum, are hardly perennials, growing best in dry, warm soils; divide and transplant in autumn or spring; a winter supply is provided by cutting the stems, when the plant is in flower, and drying in an airy, shady place.

Mint, Mentha viridis.— A hardy native labiate perennial, often called Spearmint. The running underground roots should be taken up in February or March, and replanted in fresh, good soil. The young tops may be obtained early by forcing; the leafy stems may also be cut when at their full growth in summer, and dried for winter use. The *Peppermint,* Mentha piperita, is cultivated like the spearmint, only its runners grow above instead of beneath the ground, and require planting accordingly.

Parsley, Petroselinum sativum.— A hardy umbelliferous biennial; sow in February, again in May, and again in July to have a good supply, a portion of the last-sown crop being protected by frames or hand-lights, so as to be accessible in frosty weather; it likes a free soil of good quality, but not too richly manured.

Pennyroyal, Mentha Pulegium.— A hardy native labiate perennial, growing in moist situations, and best cultivated on a north border, is propagated freely enough by its running stems, which should be well established early in autumn.

Rosemary, Rosmarinus officinalis.—An evergreen undershrub of the labiate order, just tender enough to be killed in all but the most sheltered situations by the most severe British winters, but surviving uninjured through those of ordinary severity. It requires a light, dry soil and a sheltered situation, and is increased by cuttings or rooted slips taken off in spring.

Rue, Ruta graveolens.— A hardy evergreen rutaceous undershrub, which will grow freely in ordinary garden soil, and is propagated by cuttings or slips, or very freely by seeds, which ripen abundantly.

Sage, Salvia officinalis.— A hardy evergreen undershrub, belonging to the labiates, of which there are two varieties, the green-leaved and the red-leaved, the latter being somewhat the hardiest; it is increased by earthing up the outside stems, which after the lapse of a year may be taken off as rooted plants in the following April or May.

Savory, Satureja hortensis.—A hardy labiate annual; sow on a warm border in April; when the plants reach the flowering stage dry a portion for winter use. The *Winter Savory,* Satureja montana, a hardy evergreen undershrub, is propagated by cuttings taken off in April and May, or by dividing the plant about April.

Tansy, Tanacetum vulgare.— A hardy composite native perennial, which soon grows thick and exhausts the soil, and should therefore be divided and transplanted every second year. If required earlier than the natural season, a root or two may be potted and set in a mild forcing-house or hotbed.

Tarragon, Artemisia Dracunculus. — A hardy perennial composite plant, which grows freely in light, dryish soil, and is increased by division in October or March; it should be transplanted every year or two. Tarragon may be had during the winter by potting a root or two early in December, and placing them in heat.

Thyme, Thymus vulgarus.— A hardy evergreen undershrub, requiring a light, dry, warm soil, and an open but sheltered situation; it may be raised from seeds sown in April and thinned out; or the old roots may be divided about April. The tops should be cut in summer, and preserved for winter use in the same way as savory and marjoram. The *Lemon Thyme,* Thymus citriodorus, is of a more decumbent habit, and may be parted and transplanted in spring in genial weather during the month of April.

Wormwood, Artemisia Absinthium.— A hardy native composite perennial, which will grow in any soil, but is most aromatic on those which are dry and poor. The plants should be replaced annually in autumn, when self-sown plants are generally to be found round about the old ones; if not so produced, they can be provided by sowing the seeds during the summer.

HOSEA, the son of Beêrî, the first in order of the minor prophets. The name Hosea (הוֹשֵׁעַ, LXX. 'Ωσηέ, Vulg. *Osee,* and so our English version in Romans ix. 25) ought rather to be written Hoshea, and is identical with that borne by the last king of Ephraim, and by Joshua in Numbers. Of the life of Hosea we know nothing beyond what can be gathered from his prophecies. That he was a citizen of the northern kingdom appears from the whole tenor of the book, but most expressly from i. 2, where "the land," the prophet's land, is the realm of Israel, and vii. 5, where "our king" is the king of Samaria. The date at which Hosea flourished is given in the title, i. 1, by the reigning kings of Judah and Israel.

The first part of Hosea's prophetic work, corresponding to chapters i.–iii., lay in the years of external prosperity immediately preceding the catastrophe of the house of Jehu in or near the year 750. The second part of the book is a summary of prophetic teaching during the subsequent troublous reign of Menahem, and must have been completed before 734 B.C. Apart from the narrative in chapters i.–iii., to which we shall presently recur, the book throws little or no light on the details of Hosea's life. It appears from ix. 7, 8, that his prophetic work was greatly embarrassed by opposition, "As for the prophet, a fowler's snare is in all his ways, and enmity in the house of his God."

The most interesting problem of Hosea's history lies in the interpretation of the story of his married life, (chaps. i.–iii.) We read in these chapters that God's revelation to Hosea began when in accordance with a divine command he married a profligate wife Gomer, the daughter of Diblaim. Three children were born in this marriage, and received symbolical names, illustrative of the divine purpose toward Israel, which are expounded in chap. i. In chap. ii. the faithlessness of Israel to Jehovah, the long-suffering of God, the moral discipline of sorrow and tribulation by which He will yet bring back His erring people and betroth it to Himself forever in righteousness, love, and truth, are depicted under the figure of the relation of a husband to an erring spouse. The suggestion of this allegory lies in the prophet's marriage with Gomer, but the details are worked out quite independently, and under a rich multiplicity of figures derived from other sources. In the third chapter we return to the personal experience of the prophet. His faithless wife had at length left him and fallen, under circumstances which are not detailed, into a state of misery, from which Hosea, still following her with tender affection, and encouraged by a divine command, brought her back and restored her to his house, where he kept her in seclusion, and patiently watched over her for many days, yet not readmitting her to the privileges of a wife.

HOSHANGÁBÁD, a British district in the chief commissionership of the Central Provinces of India. It is bounded north by the Narbadá (Nerbudda), which separates it from the territories of Bhopál, Sindhia, and Holkar; east by the Dudhi river, dividing it from Narsinghpur district; south by the districts of Western Berar, Betúl, and Chindwára; and west by Nimár. Hoshangábád may be described as a valley of varying breadth, extending for 150 miles between the Nerbudda and the Sátpura mountains. Area, 4,437 square miles.

HOSHANGABAD, the headquarters town of the above district, is situated on the south side of the Nerbudda. Pop. (1901), about 20,000. It is supposed to have been founded by Hoshang Sháh, the second of the Ghorí kings of Málwá; but it remained an insignificant place till the Bhopál conquest about 1720, when a massive stone fort was constructed, with its base on the river, commanding the Bhopál road.

HOSIERY. Under this name is embraced a wide range of manufactured textiles, which are classed together more on account of their manner of fabrication than from similarity of application or use. The term, as is quite obvious, has its origin in hose or stockings; but although stockings continue to be one of the staples of hosiery, that department is only one of a very numerous and diversified range of applications of the entire industry, it having been officially stated that not fewer than 5,000 distinct articles are made in the trade. All kinds of hosiery proper are made by the process of knitting, and the industry has been principally to deal with the fabrication of knitted under-clothing.

The art of knitting is the youngest of all the important textile manufactures, and, compared with the others, its origin is quite modern. No certain allusion to the art occurs before the beginning of the fifteenth century.

The peculiarity of knitting consists in the use of a single thread for the entire texture, and in the formation therewith of a singularly elastic, yet strong and firm looped web.

The process of hand-knitting is universally known, and the endless details of fancy stitches and loops, whereby ornamented work can be produced, do not come within the scope of hosiery proper. While a vast quantity of the best and most comfortable hosiery is made with implements so simple and inexpensive as four knitting wires or needles, the manufacturing industry is carried on with machinery of unsurpassed ingenuity and complexity. Moreover, domestic knitting machines, mostly of American origin, have of late years been introduced, and, although these can never be expected to attain the popular favor of the sewing-machine, yet they have been widely adopted.

In the year 1589 the stocking-frame, the machine which mechanically produces the looped stitch in hosiery, was invented by the Rev. William Lee, a graduate of Cambridge, and native of Woodborough, near Nottingham. The fundamental principle of the apparatus consists in the substitution of a separate hooked or barbed needle for the support and working of each loop, in place of the system whereby an indefinite number of loops are skewered on one or more wires or needles. The method on which the machine is worked will be easily comprehended by the aid of the accompanying diagram (fig. 1), which represents a few of Lee's peculiar barbed needles from a frame, with yarn in process of knitting. At R is seen a thread of yarn passed over the needle stalks, and within the terminal hooks. The yarn, it will be observed, is waved or depressed between each pair of needles, whereby sufficient yarn is secured to form the separate loops of uniform size, and thus produce a regular, equal fabric. The waving or depression of the yarn is produced by allowing thin plates of shaped metal, termed sinkers, to fall between each pair of needles after the yarn has been thrown across the whole range, and these sinkers, according to their depth of fall, carry down material for a large or small loop, as the case may be. The elastic points of the needle-hooks are next pressed into a groove in the stem by means of a presser bar, which acts on the whole row of barbs, and thus a range of temporarily closed metallic hooks is formed, through which the waved yarn is threaded. Over these hooks the loops of the already formed web SS have only to be drawn to form with the material R a new series of loops; the pressure is then relieved, and now R forms a new row in the work, in place of S, and the operation is ready to be repeated for a succeeding row. It is not necessary here to enter into a description of the various mechanical devices by which Lee perfected the complex movement of his stocking-frame. It is sufficient to say, that so perfectly did he succeed in his adaptations that to this day the essential features of his machine continue in use for the class of work to which he applied it. At first Lee was only able to work a flat, even web, which, when joined at the selvages, made an unshapen cylinder; but he soon learned to shape the work at pleasure by removing loops from time to

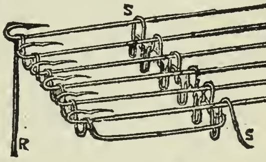


Fig. 1.

time from the outer edges of the web for narrowing or taking in, and to reverse that process for widening or letting out.

Neither Lee nor any of his relatives during their lifetime reaped an adequate reward for the great boon he conferred on mankind. His stocking-frame came gradually into extensive use, and an important industry was thereby created. No improvement of essential consequence was effected on the apparatus till in 1758 Mr. Jedediah Strutt, originally a Derbyshire farmer, adapted it to the production of ribbed work. Mr. Strutt's invention consisted of an addition to the original frame, which could be brought into use or not according as plain or ribbed work was desired. The addition consisted of a set of ribbing-needles placed at right angles to Lee's plain needles, and at the intervals required for producing ribbed courses. On the completion of a row of plain loops, the rib needles are raised; at their respective intervals they lay hold of the last-formed loop, and, bringing that through the loop which was on the rib needle itself before, they give an additional or double looping or twisting, which reverses the line of changing, and produces the ribbed appearance characteristic of this variety of work. For his invention Strutt in conjunction with his brother-in-law Woollet, a hosier, secured a patent, and they commenced the manufacture at Derby, where their "Derby-ribs" became exceeding popular. The idea of adding parts to the plain frame of Lee, thus originated by Strutt, became the fertile source of a great number of the later adaptations and modifications of the apparatus. Strutt's invention was the starting-point of a great and most honorable business in the hands of himself and his family, and the elevation of his grandson, Lord Belper, to the peerage was a direct tribute to the industrial interests of the nation.

Down till almost the middle of this century only a flat web could be knitted in the machines in use, and for the finishing of stockings, etc., it was necessary to seam up the selvages of the web shaped on the frame (fashioned work), or to cut and seam them from even web (cut work). The introduction of any device by which seamless garments could be fabricated was obviously a great desideratum, and it is a singular fact that a machine capable of doing that in a perfect manner should have been patented in 1816, while it was not seen in actual use in Nottingham, the capital of the hosiery trade, till 1845. The inventor of the round stocking-frame was no other than Sir Marc I. Brunel, who in 1816 patented his machine under the name of the *Tricoteur*. In Brunel's apparatus the needles are fixed on the rim of a rotating wheel. The yarn is delivered, the loops formed, the beards of the needles pressed down, and all the other operations performed by means of a series of arms and wheels which act on the circumference of the ring or circle of needles. As the working of such a machine is continuous, and as several sets of wheels and arms may work simultaneously around a ring of sufficient diameter, Brunel's machine was really capable of doing work with very great rapidity. He appears not, however, to have regarded his invention as worthy of being pushed into notice, and it was not till 1845 that, in an improved form, it was brought forward as an original invention by Mr. Peter Claussen, who, however, reaped no profit from his undoubted ingenuity and merit.

Another improvement of very great importance in the hosiery trade was effected through the invention of the tumbler needle, patented by Mr. M. Townsend in 1858. The tumbler needle (fig. 2) consists of a stem somewhat bulged near the point. The bulged part contains a groove in which there is hinged a short pin. The pin is so placed that, when turned to the hooked or curved point, its own point falls into a spoon-like indent, thus forming a smooth metal loop. When reversed the pin falls into the groove of the stem, making a smooth stalk. In this way, as will be clear from the figure, when the yarn is caught in the curved point of the needles, the already formed loops in being brought forward to pass off the needles carry forward the hinged pin and close the steel loop, over which they pass quite smoothly. The newly formed loop then pushes over the tumbler into its groove, and the hook is once more ready to seize the yarn as it passes along. The tumbler needle and the revolving frame together form the basis of the various domestic machines which are now in the market. In machines in which the tumbler needle is adopted the needles themselves move in grooves, each being carried forward in succession as the feed of yarn comes opposite its position.

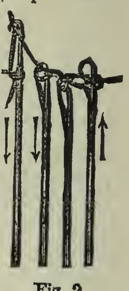


Fig. 2.

The varieties of frame now in use are embraced under narrow hand-machines, wide hand-machines, power rotary-frames, and power round-frames, the first two being exclusively used in the houses of the operatives, while the latter are factory machines driven by steam. "It will be an explanation of some interest," says the late Mr. Felkin, in a paper before the British Association (Nottingham meeting, 1866), "to those who are strangers to the process of these trades, to state that the hand-knitter of a stocking, if assiduous and clever, will knit 100 loops a minute, and that Lee on his first machine made 1,000 of worsted, and on his second 1,500 loops of silk per minute. The visitor may now see on the round frame, patented by Brunel in 1816, but since modified and improved, without any effort but to supply yarn, 250,000 loops of the finest textures made, in various colors, per minute, with safety—an advance of 2,500-fold upon the hand-knitter."

The principal center of the hosiery trade of the United Kingdom is Nottingham town and county; and in Leicestershire and Derbyshire the industry is also of importance. It was computed by Mr. Felkin that the English hosiery trade gave employment in 1866 to about 150,000 persons, of whom about 100,000 were occupied in the preliminary and finishing operations of winding, cutting, mending, seaming, etc. At that time the industry was largely domestic, frames being hired out to operatives; but the trade tends steadily toward factories. According to a parliamentary return issued July 31, 1879, there were in the United Kingdom 186 hosiery factories, giving employment to 14,992 persons, 6,683 males and 8,309 females. Of these, 175 factories were in England, 10 in Scotland, and 1 in Ireland; and centered in Nottingham, Leicester, Lincoln, Rutland and Derbyshire there were 173 of the establishments employing 13,680 of the operatives. The exports in 1878, which, of course, represent only a small proportion of the total output, amounted in value to £860,318. In the United States the industry is conducted on a manufacturing scale in New York State, Massachusetts, New Hampshire, Rhode Island, Vermont, Connecticut, and Maine; besides which family machines are extensively employed in this country. In Saxony also the trade is an important industrial feature, and there its development has been strikingly rapid. Throughout France, Spain, and Italy there are numerous frames at work, and indeed the trade may be regarded as in some degree commensurate with civilized industrial communities.

HOSIUS, or Osius, bishop of Cordova, the friend of Athanasius and the favorite of Constantine, was born about 256 A.D., most probably at Cordova, where he died in 359.

HOSPITAL is derived from the Latin *hospitalis* (adj.), and this again from the noun *hospes*, a host or guest. The place in which a guest was received was in Latin *hospitium* (hence the French, *hospice*), but in course of time the adjective became used as a noun, and the words *hospitalis*, *hospitale* and *hospitalia* were adopted in the same sense as *hospitium*, by dropping the nouns *domus*, *cubiculum*, or *cubicula*. In this sense Vitruvius uses *hospitalia* to mean the chambers where guests were received. The English word *hospital* (often reduced to *spital*) comes from the old French *hospital*, now *hôpital*, of which Littré says that it was remade from the Latin many centuries ago, although originally *hospitalis* had given rise quite regularly to *hostel*, now *hôtel*. The three words, *hôpital*, *hospice* and *hôtel*, although from the same source, are used now in very different meanings, the first being usually restricted to establishments for temporary occupation by the sick and hurt, for the purposes of medical and surgical treatment; the second (*hospice*) to places for permanent occupation by the poor, the infirm, the incurable, or the insane; and the last (*hôtel*) to dwellings, either public or private, for ordinary occupation. To the last, however, there is one exception, viz., when the term *hôtel-Dieu* (that is *hôtel de Dieu*) is applied to the chief hospital or infirmary of a town or city. In English we have no equivalent to *hospice*, so that the word *hospital* has been, and is still, used in the double sense, viz., as a place for medical treatment, and also as a retreat or almshouse for the poor, the infirm, etc. On the other hand the word *infirmary*, which originally meant a place or room set apart in an establishment (such as a monastery) for the reception of the sick members, and also for those who were through age or infirmity incapacitated from work, is not infrequently employed in the same sense as *hospital*, namely, as a separate establishment for the treatment of the sick.

Although in ancient times there may have been places for the reception of strangers and travelers, it seems at least doubtful if there was anything of the nature of a charitable institution for the reception of the sick, such as existed after the introduction of Christianity. The origin of our present hospital must be looked for in the monastic arrangements for the care of the sick and indigent. Every monastery had its *infirmaria*, managed by an *infirmarius*, in which not only were sick and convalescents treated, but also the aged, the blind, the weak, etc., were housed. In course of time separate buildings were erected for the purpose, and special revenues, augmented from time to time by benefactions, appropriated for their maintenance. In numerous instances, however, the hospitals were converted into benefices by the priests, and the scandal had to be dealt with by the authority of general councils, which, like that of Vienne, forbade the practice. About the earliest distinct record of the building of a hospital in England is in the life of Lanfranc, archbishop of Canterbury, who in 1080 founded two, one for leprosy and one for ordinary diseases. The former is referred to in the *Vie de St. Thomas le Martyr*, a work of the twelfth century. The establishments for the sick remained in the hands of the clergy until the Reformation, when some of the monasteries and church property were appropriated and set apart for the use of the sick.

Hospitals are usually divided into *General* and *Special*.

In *General Hospitals* cases of all kinds are admitted in some, while in others certain classes are excluded.

Special Hospitals are of various kinds, such as lying-in hospitals, ophthalmic, lock (for venereal diseases), cancer, consumption, etc., besides fever and small-pox hospitals. At the end of the last and beginning of this century, fever hospitals were generally called "houses of recovery," with a view of not alarming the people too much who had to resort to them. Special hospitals are also set apart for the treatment of diseases of children.

Besides the various civil hospitals there are also naval and military hospitals for the cure of sailors and soldiers.

Although hospitals have been intended as a blessing and benefit to the poor, they have too often proved the reverse, on account of the ignorance, on the part of their administrators, of the true principles of health. So much was this the case formerly that it has been not infrequently debated whether hospitals are or are not gigantic evils; and even where it is admitted that they are of value in cases of actual disease, it is still doubtful if they are really of benefit in cases of confinement. It may be of use to consider briefly the statistics of mortality at different times and in different places. It is very difficult to compare former death-rates with present or recent if we consider cases in bulk, because previous to the present century it was but little the custom to classify cases; so that a preponderance of surgical cases might exist at one period and of medical at another, with a corresponding variation of the death-rate. Of course in some exceptional instances we can point to remarkable differences due to known causes of unhealthiness. Thus in the Hôtel-Dieu of Paris, in the last century, a terrible mortality occurred, amounting to 1 in 4½, or 220 per 1,000 (Tenon); and in the British hospitals at Scutari the mortality reached between 400 and 500 per 1,000. In both of those cases there was inordinate crowding, such as is hardly likely to be met with again. But in dealing with ordinary hospitals there are so many modifying causes that the comparison, without careful analysis, may be misleading. But it is when we examine the mortality of special cases that the most instructive lessons are to be learned; and the best for this purpose are surgical cases and lying-in cases. From these we gather that the mortality is pretty generally in the ratio of the size of the hospital and the consequent aggregation of patients, the crowding together of patients in the wards, the deficiency of ventilation, defective sewerage arrangements, and the want of constant attention to the details of cleanliness. Thus Sir James Simpson showed in his paper on "Hospitalism" the following statistics of mortality from amputations:

	Deaths per 1,000.
St. Bartholomew's	366
London Hospital, Whitechapel	473
Guy's	382
St. George's	388
Nine London hospitals	411
Royal Infirmary, Edinburgh	433
" " Glasgow	391
Eleven large and Metropolitan hospitals	410

On the other hand, amputations in country practice give a death-rate of only 108 per 1,000.

Comparing the results with the size of the hospital, that is, the aggregation of cases, we find:

	Deaths per 1,000.
Large Parisian hospitals, with more than 600 beds (Husson)	620
English hospitals, 301 to 600 beds	410
" " 201 to 300 "	300
" " 101 to 200 "	230
" " 25 to 100 "	180
Cottage hospitals under 25 beds	140
Isolated rooms in country practice	108

The question of lying-in cases is even more remarkable. Doctor Lefort, having collected the statistics of

688,302 delivered in hospitals, and of 934,781 delivered at home, shows that in hospitals 35 per 1,000 die, and at home 4¾.

Doctor Steele gives the statistics of the four great lying-in hospitals of London, compared with the "extern-maternity" charities of Guy's, St. Bartholomew's, and St. Thomas':—

	Queen Charlotte's Lying-in.	British Lying-in.	General Lying-in.	City of London Lying-in.	Guy's.	St. Bartholomew's.	St. Thomas'.
Deaths per 1000......	2.82	15.7	14.8	13.5	4.1	3.1	3.5

Baron Meydell, chief of the sanitary department of St. Petersburg, has shown that in the largest lying-in hospital there, in which 2,000 women are confined in a year, the death-rate is from 30 to 40 per 1,000; in the second, in which about 1,000 women per annum are received, only 25 die; in the third, where 400 are received, only 20 die per 1,000; in the small detached asylums of two or three beds, of which there are eleven in different parts of the city, giving accommodation to 1,600 women per annum, or about 155 each, only 9 per 1,000 die; while among those confined in their own homes, including the poorest and most wretched, only 5 per 1,000 die. These numbers correspond with the observations above.

It can also be shown that outbreaks of disease are coincident with individual overcrowding, whether the hospital be large or small. Thus the terrible mortality of the Hôtel-Dieu of Paris in the last century was due as much to actual overcrowding as to the enormous aggregation of patients. The extraordinary spectacle was to be seen there of two or three small-pox patients, or several surgical cases, or sometimes even four parturient women lying in one bed. A large proportion of the beds were purposely made for four patients, and six were frequently crowded in.

The ill effects of overcrowding are seen in outbreaks of erysipelas, hospital gangrene, and surgical fever among surgical cases, and in puerperal fever in lying-in cases, while in all communicable diseases the danger of spreading is greatly intensified. It has been observed, that when only two or three women were in a ward, puerperal disease rarely showed itself, but that when five or six were put in, disease generally broke out.

Another great cause of mortality has been inefficient ventilation. If we can scatter our sick population and give them individually plenty of space in their wards, we shall have done much; but, if we do not also change the air sufficiently often we may still have evil results with all our care. Formerly no arrangements were made for ventilation in hospitals, schools, barracks, churches, or indeed in any buildings whatsoever. An immense deal remains to be desired in this direction still, but in recent hospitals, at least, more or less efficient means have been introduced, while efforts have been made to improve the conditions of the old. The want of fresh air aggravates all diseases, increases the power of infection, retards the convalescence, and hastens the death of patients; moreover, it lowers the tone of the healthy, and is the most potent of all agents in the propagation of phthisis or destructive lung disease.

Defective arrangements for the removal of excreta have constituted another cause of mortality. Water closets opening directly out of wards, and sinks, waste-pipes, bath-pipes, etc., in direct communication with the sewers, have been the means of introducing sewer poison into hospitals, producing surgical and puerperal diseases, enteric fever, and diphtheria, and aggravating every other form of malady.

A want of constant attention to the details of cleanliness has been a fertile source of hospital disease. Dr. B. W. Richardson has traced out in a very instructive way the remarkable immunity of the Jews from epidemic and other diseases, and has shown that their religious attention to the details of the periodic cleansing enjoined by the Mosaic law appears to be the main cause of this notable circumstance. An instructive instance of the importance of this point is recorded by Mr. W. Cadge, surgeon of the Norwich Infirmary, which institution had long suffered from surgical diseases, such as erysipelas, pyæmia, and the like. These, it was supposed, were mainly due to the age and structural defects of the building, so that it was determined to pull it down and reconstruct it throughout. In the meantime a change of administration took place, and a new matron was introduced, who effected an entire alteration in the arrangements, and in particular insisted on an absolute and unremitting attention to every detail of cleanliness, both of building, clothing, bedding, and person. The result was an immediate cessation of the dreaded complications which had so vexed the hospital, and from that time there has been no return of them.

Faulty diet had also, doubtless, its influence on mortality, although its effects would be less easy to trace. One singular feature in the last century was the enormous allowance of beer given to patients in hospital, from two to three pints being common, and the allowance sometimes reaching half a gallon per diem. The absence of fresh vegetables from the diet, not only of hospitals but also of the populace at large, probably introduced a scorbutic taint which may have had some part in aggravating or modifying disease.

Some influence must also be allowed to the indiscriminate mixture of cases. The evil of this, especially in the more or less crowded state of the older hospitals, was recognized even in the last century, and was referred to by Tenon among others. Although the danger is materially lessened when ample space per bed is allowed, it is still unadvisable, not to say unfair, to place contagious cases with other patients. The argument has been advanced that by distributing infectious cases there is less danger of concentration of poison than when they are congregated together by themselves. With proper hygienic precautions, however, this concentration may be minimized, while the isolation of such cases gives the greatest immunity to others.

This question of concentration has been pushed still further, so as to bear against the existence of all hospitals whatsoever, and so far as lying-in hospitals are concerned we have seen that the objections are well founded. But when we consider the subject in its various aspects it must be admitted that it would be difficult to do without hospitals in some form or another. It would hardly be possible to afford people the same advantages of treatment, attendance, nursing, and comforts at their own homes, although in some cases the system of home treatment might be advantageously substituted, as has been done for so many years with so much success in Edinburgh and other towns of Scotland on the dispensary system. Another most important aspect of the question is the necessity for hospitals as places of instruction for those entering the profession of medicine. Although it would be wrong to subordinate in any serious way the claims of patients of any class to the requirements of teaching, it must yet be admitted that the only sound way of learning medicine and surgery is by clinical or bedside instruction, and we may therefore reasonably demand that those who owe their treatment and care to public charity should be willing so far to contribute to the general welfare. Now it is clear that in dealing with large classes of students it would hardly be possible to convey proper clinical instruction except in a hospital. For this purpose the provincial hospitals ought to be more largely utilized, in addition to the metropolitan; at present the resources of the former are to a great extent wasted for teaching purposes.

Assuming then the necessity for hospitals, there still remains the question of the kind of hospital that should be constructed or approved of. It is certainly open to doubt whether we should continue to build monumental hospitals, and not rather construct slighter buildings, which may be destroyed and rebuilt from time to time, thus both scattering patients over a wider area and lessening the risk from long accumulation of infective material. This latter has been named the cottage or hut system of construction. The difficulties attending it are chiefly connected with original expense of site and with the current expenses of nursing and administration. On the other hand, it may be urged with some reason that with correct hygienic management there is no reason why a large hospital should not kept in a healthy condition.

Naval and Military Hospitals.—These are provided in all civilized countries for the care of the sailors and soldiers of the states. The two great English hospitals of Greenwich and Chelsea were founded as asylums for disabled and superannuated sailors and soldiers, but the former is now given up for that purpose, although a part is appropriated as a hospital for sick merchant seamen of all nations. The chief naval hospitals are those of Haslar, Plymouth, and Chatham. Haslar is the largest hospital in the country. The principal military hospitals are the Royal Victoria Hospital at Netley (the invaliding hospital of the army and the locality of the army medical school), the Herbert Hospital at Woolwich, the Cambridge Hospital at Aldershott, and numerous others at the principal stations.

In France there have long been hospitals established for the navy, such as those at Rochefort, Toulon, Brest, etc., as well as schools of instruction for medical officers. The chief military hospital is the Val de Grâce at Paris, formerly a convent; it is there that the medical school for the army is located. Large hospitals are also established in all the great stations. Great attention to military hospitals is also paid in Germany, Austria, and other countries of Europe. In most of them the administration is in the hands of the medical department, except in France, where the intendance still holds the reins, much to the disadvantage of efficiency and good working.

In the United States the army is small and chiefly employed on frontier duties, so that the hospitals are all what are called post hospitals, and as a rule are wooden huts or temporary structures, built to last ten years, and to hold twelve to twenty-four beds. There are, however, several permanent hospitals, among them being one for cadets at West Point, and another, the Barnes Hospital, at the Soldiers' Home near Washington. Upon inquiry Capt. C. A. H. McCauley, quartermaster of the Division of the Missouri, kindly informed us "that there were now no general military hospitals in the United States, but each military post has a hospital of its own. The largest posts are as follows: Forts Leavenworth, and Riley, Kan.; Omaha, Niobrara, and Robinson, Neb.; Yates, N. D.; Russell, Wyo.; Clark, Tex.; Wayne, Mich.; Wingate, N. M.; Douglas, Utah; Meade, S. D.; Keogh, Custer and Assinniboine, Mont.; Sill, I. T.; Grant, Ariz.: McPherson, Ga.; San Antonio, Tex.; and Vancouver Barracks, Wash.; Presido, San Francisco, Cal." All the arrangements are under the army medical department. The navy and mercantile marine were long amalgamated in America, so far as hospital arrangements went. The Marine Hospital Service was formed in 1798, and the navy was not separated from it until 1811, although it was not for some years after that special naval hospitals were built. In connection with the marine hospital service, hospitals have been established at a great number of ports, both sea, river, and lake. Up to 1870 each of these hospitals had its own organization, but since that time a regular service has been established under a supervising surgeon-general. A tax of forty cents a month is levied for the service upon all seamen or members whatsoever of a ship's company. One of the finest hospitals is the Mercantile Marine Hospital at Chicago, a pavilion building of several stories, and of considerable architectural pretensions. But in America, as in Europe, the tendency has latterly been to abandon such monumental hospitals, and to construct single-storied pavilions on the hut or "barrack" principle, the word barrack being employed in this sense as equivalent to the French *baraque*, a wooden hut. Accordingly the new marine hospital at San Francisco has been thus constructed, three one-storied pavilions of California redwood radiating from the outside of a curved corridor, from the ends and inner center of which project the administrative blocks. The cost is about $600 per bed, whereas the average cost of the older ones was fully seven times that amount, with the drawback that in course of time they became extremely unhealthy, and showed all the evils of hospitalism.

In America great attention has been paid to the question of hospitals, especially since its importance was so roughly thrust upon the country's notice in the great civil war of 1861–65. During that time numerous plans were tried, and among others the old plan of Petit, Poyet, etc., namely, radiating pavilions from a circular or oval center, which contained the offices and administration. This plan was found not to be a good one, as it interfered with both lighting and ventilation. The earliest American hospital of any size was the Pennsylvanian Hospital of Philadelphia, which was begun in 1755, under the auspices of Dr. Thomas Bond and Benjamin Franklin, and finished in 1805. It was also in Philadelphia that the first pavilion hospital of a permanent character was erected, the cornerstone being laid in 1860; in it the pavilions are parallel, two stories besides basement and attics. In New York there is a large amount of hospital accommodation. The Johns Hopkins Hospital at Baltimore will be memorable for the care bestowed upon the consideration of its plans. The one finally adopted is on the pavilion principle, scattered over a wide space of ground.

The hospitals of Chicago are numerous and well-appointed, the most notable among them being, Cook County Hospital, the Alexian Brothers' Hospital, Chicago Hospital for Women and Children, Hahnemann Hospital, Mercy Hospital, Michael Reese Hospital, Presbyterian Hospital, St. Luke's Hospital, Augustana Hospital, German Hospital, Bennett Hospital, Emergency Hospital, Chicago Floating Hospital, Homœopathic Hospital, Maurice Porter Memorial Hospital, National Temperance Hospital, St. Elizabeth's Hospital, St. Joseph's Hospital, Wesley Hospital, and Woman's Hospital of Chicago. Besides these there are two eye and ear infirmaries. Some of these are municipal institutions, some sustained by private beneficence, while others are denominational in their government. Various nationalities are also represented in the management of some of the above. Some are devoted to women entirely, some to children, while others make no distinction as to sex. The medical attendance is excellent, and the best sanitary conditions prevail in the majority of instances.

HOSPITIUM. The power the Greeks possessed of traveling safely among other Greek states depended on the feeling which made hospitality a matter of religion, and looked on strangers as under the protection of Zeus Xenios. A stranger was received and protected during his stay. Violation of the duties of hospitality was likely to provoke the wrath of the gods; but it does not appear that anything beyond this religious sanction existed to guard the rights of a traveler. There is, however, no ground for the common statement that a stranger was *ipso facto* considered as an enemy.

HOST (Lat. *hostia*, "victim"), the name given in the Roman Catholic Church to the consecrated bread of the eucharist. It is so called in conformity with the doctrine of that church that the eucharist is a "sacrifice" in the strict sense of the word, though in the common language of Catholics, "host" is the use for the unconsecrated altar-bread, and even so occurs in the offertory of the Roman missal. The host in the Latin Church is a thin circular wafer (in Old English, "syngeing cake") of unleavened bread, made of the finest flour, and bearing stamped upon it the figure of the Crucifixion or some emblematic device, as the Lamb, or the letters IHS. These are the "points" and "figures" forbidden in the first book of Edward VI. In all ancient liturgical rites the consecrated host was broken before being consumed by the priest. In the Roman Church the celebrant, who uses at mass a larger host than that reserved for other communicants, first breaks it into two halves, and then from one half detaches a fragment which he drops into the chalice. In the Greek and other oriental churches, as well as in various Protestant communities, the eucharist is celebrated in leavened bread; and one of the grounds of separation from the West alleged by Michael Cerularius was the western practice of using unleavened bread. The use of unleavened bread is founded on the belief that Christ can only have used such bread when instituting the eucharist at the Paschal feast. Luther followed the Roman Church in this point, but did not break the host. It was decided by the Privy-conncil, in the Purchas case (1871), that the use of the wafer is forbidden in the Church of England. The elevation of the host is the act by which the priest immediately after pronouncing the words of consecration raises the host with both hands above his head, while the server tinkles his bell to call attention to the ceremony, that the congregation may adore Christ present.

HOSTAGE, a person given to an enemy as a pledge for the proper fulfillment of treaty conditions. Formerly the evasion of the terms of the treaty by one of the contracting parties used to be regarded as entitling the enemy to put to death the hostages that had been given up to them. The shooting of Archbishop Darboy and his fellow hostages in 1871 was the most execrable crime of the Paris Communists.

HOTCH-POT (or HOTCH-POTCH, HODGE-PODGE), in law, is the name given to a rule of equity whereby a person, interested along with others in a common fund, and having already received something in the same interest, is required to surrender what has been so acquired into the common fund, on pain of being excluded from the distribution.

HOTHO, HEINRICH GUSTAV, was born at Berlin in 1802, and died in his native city on Christmas day, 1873. He made a name for himself in Germany as a historian rather than as a critic of art.

HOTMAN, or HOTTOMAN, FRANCOIS, one of the most learned of French civilians, and a brilliant publicist, was born at Paris in 1524. He died at Basel in 1590. At Geneva Hotman was appointed professor of Roman law, and taught in peace for six years; in 1579, however, the threatening approach of the duke of Savoy frightened him away to Basel. Thence the plague sent him to Montbéliard in 1582, where he lost his faithful wife. After making trial of Geneva once more, he again fled to Basel. His principal work was the *Franco-Gallia.*

HOT SPRINGS, a town of Arkansas, in Garland county (about forty-five miles southwest of Little Rock) which takes its name from the thermal springs in the vicinity, and is much frequented by sufferers from chronic diseases. These springs, fifty-seven in number, range in temperature from 93° to 150°. They flow from the side of a mountain into a creek which joins the Washitaw river, about six miles from the town. They contain various carbonates and carbonic acid in solution, besides other constituents, and are held to be peculiarly efficacious (in conjunction with other medicinal and sanitary measures) in cases of blood diseases, such as secondary or tertiary syphilis and its sequelæ, rheumatism, neuralgia, etc. There are various methods of using these healing waters, from simple baths in them to using them in conjunction with liberal inunctions of mercury and other substances intended to have a depurating effect. Close by are chalybeate and sulphur springs which have a large patronage. The whole region about the town abounds in minerals of various kinds—the most prominent among them being a kind of oilstone useful as hones or whetstones on which to sharpen cutlery. The town has newspapers, churches, schools, etc., and a manufactory of oilstones, but its principal prosperity is dependent on the influx of visitors to the springs. It has railroad and telegraph connections, and banking facilities, and some trade with the surrounding country. Its hotel accommodations are good. The resident population was returned in 1900 (U. S. census) at 9,973.

HOTTENTOTS was the generic name given by Europeans to the native tribes inhabiting the southern extremity of Africa. These aborigines, totally distinct as they were in their primitive state from all other African races, have been generally regarded as the most ancient inhabitants of the land. When Sir John Barrow described their condition in 1798, he estimated their numbers at about 15,000 souls. In 1806 the official return gave a population of 9,784 males and 10,642 females. In 1824 they had increased to 31,000. At the census of 1865 they numbered 81,589, and the census of 1889 gave the Hottentot population within the Cape Colony at 90,000. In the returns for the last-mentioned periods, however, the designation "Hottentot" has no doubt embraced many persons of mixed race. The primitive character of the Hottentot or Khoi-Khoin has been greatly changed by their forced migrations, and their gradual adoption of the habits of civilized life. The best information as to their original manners and customs is therefore to be obtained from the descriptions given of them by the older writers, and especially that of Kolben, a German writer, All authorities agree in representing the natural disposition of the Hottentots as mild, placable, and ingenuous. Mutual affection was the greatest of their virtues. They held in contempt the man who could eat, drink, or smoke alone. They were hospitable to strangers; indeed, their munificence often left them scarcely anything for themselves. Another characteristic was indolence. While not deficient in talents or capacity, they seemed to lack the energy to call them into action. They did not, however, disdain to look after their cattle. Hunting they pursued for pleasure as well as sustenance, and when once aroused they were nimble and active, as well as bold and ardent. In personal appearance they were of a medium height, the females rather smaller than the men. Their bodies were slender but well proportioned, with small hands and feet. Their skin was of a leathery-brown color; their face oval, with prominent projecting cheekbones; eyes dark chestnut or black and wide apart; nose broad and thick and flat at the root; chin pointed, and mouth large, with thick, turned-up lips. Their woolly hair grew in short, thick, curly tufts on their head, and the beard very scanty. The women, especially as they advanced in years, had flabby breasts hanging down low; abnormal developments of fat were somewhat common among them; and cases occurred of extraordinary elongation of the *labia minora* and of the *præputium clitoridis.*

The dress of the men was very simple. A cloak or kaross, varying according to the fashion of the tribe, was usually thrown across the shoulders and a smaller one across the loins. Those of the chiefs or captains were usually of tiger or wildcat skins, those of the commonalty of sheep skins. They wore the cloaks all the year round, turning the hairy side inward in winter and outward in summer; they slept in them at night, and when they died they were interred in them. They had suspended around their necks little bags or pouches, containing their knives, their pipes and tobacco or daccha (*Cannabis*, or hemp), and an amulet of burnt wood. On their arms were rings of ivory. When they drove their herds to pasture they wore sandals on their feet, and some of them carried a jackal's tail fastened on a stick to wipe their face with when heated and drive away the flies. The women also wore karosses, a lesser under a greater, fashioned much like those of the men, but with the addition of a little apron, to which were appended their ornaments. In a leather bag suspended round their neck they carried daily, whether at home or abroad, some victuals, together with their daccha, tobacco, and pipe. They also wore an ornamented skin cap on their heads, armlets of iron or copper on their arms, strings of beads around their wrists, and around their legs thongs of oxhide sometimes covering half the leg or more.

They loved to besmear their bodies and their dress with greasy substances. The wealthy Hottentots were very lavish in the matter of butter and fat, the use of which was the grand distinction between rich and poor. They also perfumed themselves with the powdered leaves of a shrub called by them buchu (*Diosma crenata*). An ointment formed of soot and grease and the powder of buchu was held in very high estimation.

The sites of their villages or kraals were usually on green meadow grounds. They never entirely exhausted the grass or herbage, but kept moving at intervals from one spot to another. The huts or tents, which they could strike, carry, or pitch where they chose, were ranged in circles, the area of which varied with the pastoral wealth of the community. The small cattle were placed inside the circle, and the larger cattle outside. In the center of the huts a hole served for a fireplace, around which the members of the family were fond of squatting upon their haunches while they passed the tobacco pipe from one to another.

Their social pleasures consisted in feasting, smoking, dancing, and singing. Every signal event of life, and every change of abode and condition was celebrated with a feast.

Circumcision, which is common to the Kaffre tribes, was unknown to them, but when a youth entered upon manhood a particular ceremony was performed. One of the elders or officiating priests, using a knife of sharp quartz, made incisions on the young man's body, and afterward besprinkled the same with urine.

The system of government was patriarchal. Each tribe had its hereditary "khu-khoi" or "gao-ao" or chief, and each kraal or encampment its captain. These met in council whenever any great matters affecting the privileges of the people had to be decided. They had no salary, but their persons were held in great reverence, and they were installed in office with solemnities and feasting. In certain tribes the hind part of every bullock which was slaughtered was sent to the chief, and this he distributed among the males of the village. He also collected sufficient milk at the door of his hut to deal out among the poor. A part of every animal taken in hunting was exacted by the chief, even though it was in a state of putrefaction when brought to him.

The captains assisted by the men of each kraal attended to the settlement of disputes regarding property and to the trial of criminals. A murderer was beaten or stoned to death; but if one escaped and was at large for a whole year, he was allowed to go unpunished. Adultery seldom occurred; if anyone found parties in the act and killed them he was no murderer, but on the contrary received praise for his deed. Women found offending were burned. Theft, especially cattle-stealing, was severely punished.

The religious ideas of the Hottentots were very obscure. Vaillant says they had "neither priests, nor temples, nor idols, nor ceremonials, nor any traces of the notion of a deity."

Various ceremonies were practiced to ward off the evil influence of ghosts and specters, and charms were freely employed. There was also a belief that in every fountain there was a snake, and that as long as the snake remained there water would continue to flow, but that if the snake was killed or left the fountain it would cease. Offerings were sometimes made to the spirit of the fountain.

HOTTINGER, Johann Heinrich, a Swiss philologist and theologian, was born at Zurich, March 10, 1620. In 1667 he was drowned along with three of his children by the upsetting of a boat while crossing the River Limmath.

HOUBRAKEN, Jacobus, Dutch engraver, was born at Dort, December 25, 1698. He died on November 14, 1780, having nearly completed his eighty-second year.

HOUDON, Jean Antoine, was the most distinguished sculptor produced by France in the latter half of the eighteenth century. With Franklin, whose bust he had recently executed, Houdon left France for the United States in 1785, and, staying some time with Washington at Philadelphia, he modeled the bust, with which he decided to go back to Paris, there to complete the statue destined for the assembly hall of the State of Virginia. This statue, the execution of which is the principal interesting fact in the artist's life to Americans, now stands in the rotunda of the State capitol at Richmond, and represents Washington beside a plow, with his sword by his side. Houdon died at Paris in 1828.

HOUND. The foxhound, harrier and beagle are now the only representatives of whatever varieties of hounds existed previously in England. The staghound proper is practically extinct.

The modern foxhound is about as near perfection as he can well be, and his excellence is all the more wonderful that less than 200 years ago there does not seem to have been in existence any hound bearing a resemblance to him; for, until fox-hunting by hounds kept for that especial purpose was instituted, there could have been no reason to breed foxhounds. According to old writers on hunting subjects, there appear to have been, among other varieties, the slow, plodding, southern English hound, with a great square head and wondrous powers of working on a scent, and the lighter northern hound; and as all animals improve under the care and guidance of man, until they assume the character of a distinct breed, it is clear that such has been the case with foxhounds, the earlier breeders of which did their part toward the attainment of perfection, by breeding with much care and judgment from the best specimens at their disposal. Older breeders were satisfied if the result of their crossings possessed good noses, and were up to the standard of beauty of those days; but the time came when pace had to be added to the list of foxhound virtues, owing to the use of better bred horses in the hunting field, and at the present day the development of pace without sacrificing nose is one of the greatest difficulties a breeder has to contend with.

Three years is quite early enough to begin to breed from any hound, male or female, and by that time it will be pretty well known what are the hunting capabilities of each. Out of every litter of whelps it may be necessary to destroy some—four or five are quite enough for a mother to rear—but a diversity of opinion exists among huntsmen as to which should be kept. As the points of a very young puppy cannot be seen, the selection is really one of color; some men prefer light colors, others dark; the majority are in favor of the latter, light-colored hounds and horses being popularly supposed to have weak constitutions and uncertain tempers.

When the puppies are three or four days old the dew-claws should be severed with a small and sharp pair of scissors, and after another day or two it is usual to cut off about an inch of the tail. Rounding is the last opertion that foxhounds are subjected to, and generally takes place as soon as the puppy has quite recovered from the distemper; it consists in cutting off the ends of the ears so that they may not be torn in going through cover.

The feeding of a pack of hounds is a matter calling for the exercise of great care and judgment. Hounds' food comprises both animal and vegetable substances. Objections have sometimes been made to admitting the former into the kennel fare at all, on the ground that it is likely to impair the powers of scent, but the exception does not seem to be well-founded, because wild dogs, as also wolves and foxes, are carnivorous animals, and live by the use of their scenting powers; in moderation flesh is a necessity.

The harrier, like the foxhound, is a very different animal from what he was one hundred years ago. Then there were several sorts used in England in hare-hunting; first came the old southern hound, used principally in heavy countries; the second variety was a somewhat faster dog, with a sharp nose and pointed ears, and was best adapted for an open country; thirdly, a rougher-coated hound; and, lastly, the old-fashioned blue mottled harrier, found in the Weald of Sussex and some parts of Kent. The first and last of the above list are said to have been endowed with wonderful scenting powers, and we are told that, when these hounds were in use, a run of six hours after a hare was no uncommon occurrence; but they were so slow that the same authority tells us that they fatigued "the healthy foot-man very little."

HOUNSLOW, a township, formerly a market-town, in the parishes of Isleworth and Heston, county of Middlesex, Eng., is situated on the Great Western coach road, and on a branch of the London & Southwestern railway, nine miles from Hyde Park Corner. For many years the heath was a favorite resort for highwaymen, the carcasses of whom used to be exposed on gibbets along the road. According to an act passed in the fifty-third year of George III., the heath has been inclosed, and it is now nearly all cultivated. In 1793 large cavalry barracks were erected upon it, and it also affords a site for extensive powder-mills.

HOUR, a measure of time equal to $\frac{1}{24}$th part of an astronomical day or to $\frac{1}{12}$th part of a natural day (excluding the hours of night or darkness). *Hour-circles*, in astronomy, are any great circles which cut the poles.

HOUR-GLASS, an instrument for measuring intervals of time. It is made of glass and consists of two bulbs united by a narrow neck; one of the bulbs is nearly filled with dry sand, fine enough to run freely through the orifice in an hour, if the instrument is to be an hour-glass; in a minute, if a minute-glass, etc. The obvious defects of this instrument are the expansion or contraction of the orifice produced by heat or cold, and the variations in the dryness of the sand, all of which produce deviations from the true measurement of the time. The hour-glass was almost universally employed in churches during the sixteenth and seventeenth centuries. In several of the churches in England hour-glass stands of elegant workmanship are still to be seen.

HOURI, the name of the beautiful damsels who, according to the Moslem faith, await with their companionship in Paradise the true believers after death.

HOUSATONIC RIVER rises in Massachusetts, flows through Connecticut, and enters Long Island Sound near Bridgeport. In its course of nearly 150 miles it affords water to many manufacturing villages and towns.

HOUSE-FLY. This insect may be roughly described as a quarter of an inch long, black, hairy, with a reddish oval vertical spot and golden orbits, three gray longitudinal bands on the thorax, an interrupted yellowish band at the base of the abdomen, which has lateral and apical golden spots, and the base of the wings yellowish-white. But not only allied species are liable to be confused with the house-fly; representatives of other genera, such as *Anthomyia*, *Tachina*, and *Stomoxys*, are often mistaken for it, and a puncture from the sharp beak of the latter fly has often caused a wrong charge of blood-sucking to be brought against the subject of this notice, which has a short, fleshy bilobed tongue incapable of penetrating the skin, though provided with a terminal framework of tracheal tubes, acting like a rasp, by using which it often annoys us in the heat of summer. Linnæus, who first named the fly, left its transformations undescribed; De Geer in 1776, and Bouché in 1834, described the larva and pupa, and correctly defined their habitat; but it has been reserved for Dr. A. S. Packard, jr., the well-known American entomologist and biologist, to make a thorough investigation of their whole economy.

The minute dull chalky-white eggs (usually about 120 in number), elongate oval and cylindrical in shape, are laid by the parent fly in crevices of fresh manure in or about stables—heat, and especially moisture, being required for their development. The larvæ are hatched in twenty-four hours, and pass through three stages, averaging from five to seven days in all; in the second of its stages, the larva has been observed to increase by one-third of its length in twenty-four hours. They resemble those of the well-known meat fly, *Calliphora vomitoria*, but are smaller, longer, more slender, transparent, smooth, and shining, and regularly conical. The propleg at the apex is also much smaller, and cannot be seen from above when the larva is in motion. They eat the decaying parts of the manure, leaving the bits of hay and straw. The puparium, or pupa-case, is a quarter of an inch long, cylindrical, and dark brown, closely resembling that of *Stomoxys calcitrans*, from which it chiefly differs in the larger and squarer anal spiracles and the smoother apex. The enclosed pupa is of the usual type of the cyclorhaphous *Diptera*, and is readily distinguishable from that of *Stomoxys* by its broad spatulate labium and curved maxillary palpi; it rests in the case with the hard framework of the jaws of the old larva skin next the ventral side, and when the fly pushes its way out, after remaining from five to seven days as a pupa, the upper end of the case splits off just behind the suture between the thorax and abdomen. The term "pupa" is here used in a general sense, since intermediate stages of development (variously called "pseudo-nymph" or "semi-pupa") in that condition occur in the *Muscidæ*, as in *Hymenoptera*, *Coleoptera*, etc.

On leaving the pupa-case, the fly runs about with its wings soft, small, and baggy, pressed to the side of the body, much as in the pupa. It is pale, with the colors not set, and the membraneous portion of its forehead constantly distends with air as the fly moves, being connected with the tracheæ. From Mr. Lowne's observations on the anatomy of the blow-fly, this organ is evidently employed for pushing away the end of the puparium when the pupa slips out of its case.

The whole period of evolution being thus from ten to fourteen days only, and the number of eggs laid by each female fly so numerous, it will be readily seen that any slight personal inconvenience to man, as produced by the habits of the perfect insect, are much more than compensated for by the unceasing labors of its larvæ as scavengers; the benefit being the more direct as the work is invariably done close to human habitations. The workings of the law of nature, by which an excess of increase in any one species is checked, are conspicuously shown in the case of this insect. Not only do the ordinary parasites of its own class (some Hymenopterous, and in one recorded instance Coleopterous) attack it in its earlier stages, but certain common birds are particularly addicted to it in the perfect state (in which also a *Chelifer*, a minute European representative of the scorpions, has also been found parasitically attached to it). The vegetable world also supplies some lethal agents in the shape of fungi (notably *Empusa muscæ*), individuals destroyed by which are constantly to be seen in autumn unable to move, and distended or ruptured by the expansion of the internal growth, the white spores of which are finally to be observed scattered around their victim.

Trivial as the house-fly may appear even to entomologists, it is to be noted that recent observations by the German biologist Weissman on its development have resulted in his discovery of his possessing "imaginal disks" in the early larval state — a structure deemed of sufficient value to suggest a new division of the whole *Insecta* into "Discota" and "Adiscota."

HOUSELEEK, *Sempervivum*, a genus of ornamental evergreen plants belonging to the natural order *Crassulaceæ*. About thirty species are known in gardens, some of which are hardy perennial herbs, and grow well in dry or rocky situations; the others are evergreen shrubs, or undershrubs, fit only for cultivation in the greenhouse or conservatory. The leaves are said to contain malic acid in considerable quantity, and are reckoned by herbalists to possess cooling and astringent properties. The leaves, freshly bruised, are applied to hæmorrhoids, boils, wens, and corns, and the expressed juice is used as a remedy for inflammation of the eyes and freckles, and especially for thrush (aphthæ) in children, also for stings and burns, erysipelas and herpes. Internally houseleek is used as a cooling remedy in dysentery and fluxes. The young leaves have also been eaten as salad, like *Portulaca*.

HOUSSA, HOUSA, HAUSSA, or HAUSA, an important people of the western Soudan, forming a main element in the population of the country between 12° and 13° N. latitude, from the Niger in the southwest to Bornu in the east. By Barth they are identified with the Atarantians of Herodotus; and it is certain that at a comparatively early date they attained great political power. The seven original states of Biram, Daura, Gobir, Kano, Rano, Katsena, and Zegzeg, formed a great confederation or empire, which extended its authority over many of the neighboring countries, and retained its preëminence till the beginning of the nineteenth century, when the Pullo (Fellata or Fulbe) rose upon its ruins.

The Houssa or Afnu language ranks as one of the richest and most cultivated in Africa; and it is not only the dominant vernacular throughout a large part of the Soudan, but serves as the means of communication in a great many places throughout the region to the south and west of the Lower Niger.

HOUSTON, a city of Texas, the third in point of population in the State, is located in Harris county, of which it is the capital. It is situated on Buffalo bayou, and has steamboat connection with Galveston. Houston has seven lines of railway connection, and is an important shipping point. It is forty-nine miles northwest of Galveston and one hundred and fifty-two miles south of Palestine. There are two daily and four weekly newspapers, two national and four other banks, cotton factories, machine shops, twelve churches, a convent, some fine public buildings, and considerable manufactories. Houston is the metropolis of the South Texas oil and lumber district, and the commercial centre of the southwestern rice, sugar, and tobacco trade. The Houston ship channel, for which $1,000,000 has been appropriated, will give deep sea-going facilities for vessels engaged in foreign and domestic trade. The city's bank clearings for 1901 aggregated $466,426,159. Population of city (1900), 44,633.

Houston was named after Gen. Samuel Houston (1793–1862), who captured Santa Anna at San Jacinto, and who was president of Texas when it was an independent republic, and afterward its governor and United States senator. The city stands in a pleasant, undulating country, and its principal streets are well shaded and traversed by street railroads. Of late years, owing to the opening of through railway connection with New Orleans and Southern California, its commerce has greatly increased and its population more than doubled each decade.

HOUSTON, SAMUEL, an American general and statesman, was born near Lexington, Va., March 2, 1793. On the death of his father, a soldier of the revolution, in 1807, he removed with his mother to the frontier, and, settling in Blount county, Tenn., was soon on familiar terms with the Cherokee Indians. For a while he acted as a clerk to a trader, and then as village schoolmaster; but in 1813, after a residence of nearly three years among the Indians, he joined the United States army. He served with Jackson in the war against Great Britain, and at the peace of 1815 had risen from the ranks to a lieutenancy. Although conscious of his success, and proud of having won Jackson's friendship by his bravery, he then resigned his commission and turned to the study and practice of law at Nashville. In 1823 Tennessee returned him to Congress, and four years later he was elected governor of the State. He married in January, 1829, and in the April following, without assigning any reason, he suddenly abandoned his home and his office, and took up his residence among the Cherokees, by whom he was formally adopted as a member of their nation. Returning to Washington, he successfully pleaded their cause against the government agents who had wronged them. In 1832 he settled in Texas, and was soon after elected a member of the convention called for the purpose of framing a constitution of that State, then in difficulties with the Mexican Government. On March 2, 1836, Texas declared its independence, and, on April 2d following, won it on the field of San Jacinto, where Houston, who had been appointed commander-in-chief of the Texas forces, with a body of 783 raw troops, defeated 1,600 Mexican veterans led by Santa Anna. On the recognition of the independence of Texas, Houston was elected president of the new republic, and re-elected in 1841; and, when Texas was admitted to the Union in 1845, he was returned as one of its two representatives to the senate. There he distinguished himself as a zealous friend of the Indians, opposing the Kansas and Nebraska bill in a memorable speech (March 3, 1854), and voting against the Lecompton constitution of Kansas. His decided opposition to secession obliged him in 1861 to retire from the office of governor of Texas, which he had held from 1859. He died at Huntsville, Tex., July 25, 1863. The hero of San Jacinto was above all things an able soldier, wary, intrepid, and resolute; but he also possessed as a legislator the qualities of rare foresight, cool discrimination, and fearless candor.

HOUWAERT, Jean Baptista (1533–1599), Flemish poet, was the most prominent of the rhetoricians of his day. He was born in 1533 and died in 1599.

HOVEDON, Roger of, an old English chronicler, was in all probability born at Howden, in the East Riding of Yorkshire, and was possibly a member of a family which had taken its name from the place. The date neither of his birth nor his death is known, and the first notice we have of him is as being sent in 1174 by Henry II., on whom he was in attendance in France, to endeavor to induce the lords of Galloway to withdraw from their allegiance to the king of Scotland.

HOWARD, Henry. See Surrey, Earl of.

HOWARD, John, "the philanthropist," was born in 1726, most probably on September 2d, at Enfield, England. He was, in 1773, named high sheriff of Bedford, an office which, although as a Nonconformist he was unable to take the usual tests, he resolved to accept. The characteristic work of his life may be said to have now begun. When the assizes were held he did not content himself with sitting out the trials in open court; his inquisitiveness and his benevolence alike impelled him to visit the jail to which the prisoners had been condemned. Howard found it, like all the prisons of the time, wretchedly defective in all its arrangements, but what chiefly astonished and shocked him was an almost incredible abuse arising out of the circumstance that neither the jailer nor his subordinates were salaried officers, but were dependent for their livelihood on fees which they rigorously exacted from the prisoners themselves. He found it to be a fact that some whom the juries had declared not guilty, others in whom the grand jury had not found even such appearance of guilt as would warrant a trial, others whose prosecutors had failed to appear, were frequently detained in prison for months after they had ceased to be in the position of accused parties, until they should have paid the fees of jail delivery. His prompt application to the justices of the county for a salary to the jailor in lieu of his fees was met by a demand for a precedent for charging the county with such an expense. This he undertook to find if such a thing existed. He went accordingly from county to county until his journey had extended to every town in England which contained a prison, but the object of his search eluded inquiry. He could find no precedent for charging the county with the wages of its servants, but he did find so many abuses in prison management which imagination had never conceived, and so many sufferings of which the general public knew nothing, and of which the law took no account, that he determined to devote to the exposure of those wrongs and the reform of those abuses whatever time and money might be needful. The task cost him a fortune, and the best remaining years of his life.

In April, 1775, he set out upon an extended tour through France, the Low Countries, and Germany. Returning to England in autumn with his copious notes, he determined, before finally reducing them to order and sending them to press, to undertake another tour of England. This lasted for seven months (November, 1775, to May, 1776) and yielded results so important by way of correction and supplement that he resolved to give his Continental experience the benefit of a similar revision. On this occasion he extended his tour to several of the Swiss cantons. At last in 1777 appeared *The State of the Prisons in England and Wales, with Preliminary Observations, and an Account of some Foreign Prisons* (Warrington). In 1780 he had published a quarto volume of 220 pages as an appendix (the first) to his *State of Prisons*, but on obtaining release from his employment at home his passion for accumulating statistics urged him to new and more extended Continental tours, as far as to Denmark, Sweden and Russia in 1781, and to Spain and Portugal in 1783. The results of these journeys were embodied in 1784 in a second appendix, with the publication of which his direct labors in connection with the subject of prison reform may be said to have ceased. The five remaining years of his life were chiefly devoted to researches on a different though cognate subject, that of the means which ought to be used for prevention of the plague, and for guarding against the propagation of contagious distempers in general. He died in 1790.

HOWE, John, one of the greatest of the later Puritan divines, was born May 17, 1630, at Loughborough, Leicestershire, of which parish his father was minister. He died in London on April 2, 1706.

HOWE, Richard Howe, Earl, English admiral, was born in 1725. In January, 1783, Howe succeeded Keppel as first lord of the admiralty, an office which he resigned in the following April, but again accepted under the Pitt ministry, holding it till July, 1788. In July, 1787, he was made admiral of the white, and shortly afterward was raised to an earldom. In 1790 he was appointed to the command of a fleet intended to operate against the Spaniards, but peace was concluded before any action took place. On the commencement of the war with France after the Revolution he obtained the chief command in the Channel, and on June 1, 1794, gained a great victory over the French fleet of Ushant, dismasting ten of the enemy's ships and taking seven, one of which, the *Vengeur*, sank as she was being towed away. On August 9th of the same year he resumed the command of the Channel fleet, but in none of his cruises was he fortunate enough to meet any of the enemy's vessels; and during the greater part of 1795 and 1796 ill health compelled him to remain on shore. In May, 1797, he resigned his command. In the same year he was appointed with full powers to treat with the mutineers in the British fleet at Portsmouth and Spithead, and completely succeeded, through the confidence they had in the friendliness of his intentions, and by the firm and judicious measures he adopted, in eradicating the causes of discontent. During the latter years of his life Lord Howe suffered much from ill health; and he died under a violent attack of gout, August 5, 1799.

HOWELL, James (1594–1666), a voluminous English author, best known by his collection of letters (*Epistolæ Ho-Ëlianæ*) and his *Instructions for Forreine Travell*, which, in Mr. Arber's phrase, form our first handbook for the Continent. He died in 1666, having realized to the last his favorite motto, "*Senesco non segnesco.*"

HOWITT, William, a popular writer and poet, was born in 1795 at Heanor, Derbyshire, where the Howitts had long been settled. A poem, published in 1814, on the *Influence of Nature and Poetry on National Spirit*, was, so far as we know, his first printed work. He married, in 1823, a Quaker lady, Mary Botham of Uttoxeter, who as poetess and prose-writer occupies a place in literature no less distinguished than her husband's. The first joint book appeared in the year of their marriage under the title, *The Forest Minstrel, and other Poems.* From this time to his death in 1879 the products of their joint authorship are too numerous to be given in detail, and comprise writings on a vast variety of subjects. He died at Rome on March 3, 1879.

HOWRAH, the largest and most important town in the district of Hooghly, Bengal, and the headquarters of the magisterial district of Howrah, is situated on the right bank of the Hooghly river, opposite Calcutta, and forms a suburb of that city Pop. (1901), 157,847.

HÖXTER, a town of Prussia, capital of a circle in the government district of Minden, province of Westphalia, is situated on the Weser at its confluence with the Grube and the Schelpe, and on a branch line of the Westphalian railway, two and one-half miles southwest of Holzminden.

HOYLE, Edmund or Edmond, the first systematizer of the laws of whist, and author of a book on games, was born in 1672. He died at Cavendish Square, London, August 29, 1769.

HRABANUS MAURUS MAGNENTIUS, archbishop of Mainz, and one of the most prominent teachers and writers of the Carolingian age, was born of noble parents at Mainz about the year 776. He died at Winkel on the Rhine, February 4, 856. He is frequently referred to as St. Rabanus, but incorrectly.

HROSVITHA, early mediæval dramatist and chronicler, occupies a very notable position in the history of modern European literature. Her endeavors formed part of the literary activity by which the age of the emperor Otto the Great sought to emulate that of Charles the Great. The famous nun of Gandersheim has occasionally been confounded with her namesake, a learned abbess of the same convent, who must have died at least half a century earlier. The younger Hrosvitha was born in all probability about the year 935; and if the statement be correct that she sang the praises of the three Ottos, she must have lived to near the close of the century. Some time before the year 959 she entered the Benedictine nunnery of Gandersheim, a foundation which was confined to ladies of German birth, and was highly favored by the Saxon dynasty. In 959 Gerberga, daughter of Duke Henry of Bavaria, and therefore niece of the emperor Otto I., was consecrated abbess of Gandersheim, and the earlier literary efforts of the youthful Hrosvitha (whose own connection with the royal family appears to be an unauthenticated tradition) were encouraged by the still more youthful abbess, and by a nun of the name of Richarda.

At the request of the abbess Gerberga, she composed her *Carmen de Gestis Oddonis*, an epic attempting in some degree to follow the great Roman model. It was completed by the year 968, and presented by the authoress to both the old emperor and his son (then already crowned as) Otto II. This poem so closely adheres to the materials supplied to the authoress by members of the imperial family, that, notwithstanding its courtly omissions, it is regarded as an historical authority. Unfortunately, only half of it remains; the part treating of the period from 953 to 962 is lost, with the exception of a few fragments, and the period from 962 to 967 is summarized only.

HUANCAVELICA, or Guancabelica, the chief town of a department of same name, Peru, is situated in a deep ravine, of an average width of one mile, at about 12,400 feet above sea-level, and 160 miles southeast of Lima. Population, 4,000.

HUANUCO, or Guanuco, the chief town of the Peruvian department of the same name, is situated on the left bank of the river Huallaga, near its junction with the Higueras, in a beautiful valley nearly 6,000 feet above sea-level, and 180 miles northwest of Lima.

HUARAZ, chief town of the Peruvian department of Ancachs, and of a district to which it gives its name, is situated on the left bank of the river Santa, in a fertile valley of the Andes, about 190 miles north-northwest of Lima.

HUBER, François, an eminent Swiss naturalist, especially distinguished by the originality and reach of his researches into the life history of the honey-bee, was born at Geneva, July 2, 1750. From an early age François Huber displayed a dangerous ardor for study; and he was only fifteen years old when he began, in consequence of his ill-judged assiduity, to suffer from an affection of the eyes which gradually resulted in total blindness. Happily at once for his comfort and his fame he had secured the affection of Marie Aimée Lullin. Having patiently waited till she was legally of age, she married the husband of her choice, and ministered to his wants till her death with such unceasing devotion that it was only, he said, when he lost her that he really felt he was blind. For many years her efforts were seconded by François Burnens, a servant, whom Huber had inspired with something of his own love of nature. The results of the investigations which were conducted by this happily assorted trio at once surprised and delighted the world. So skillfully did the blind man devise his experiments, and so carefully did his assistants conduct and register their observations, that the work *Nouvelles Observations sur les abeilles* laid the foundation of all our scientific knowledge of the subject.

HUBER, Johann, a philosophical and theological writer, whose name is intimately connected in Germany, and indeed throughout Europe, with the Old Catholic and other recent movements toward freedom and enlightenment, was born in very humble circumstances, on August 18, 1830, at Munich. He died suddenly of heart disease at Munich on March 20, 1879.

HUBERT (Hugubert or Hugubrecht, "the Brightwitted"), St., bishop of Liége, was son of Bertrand, duke of Guienne, and held a prominent place in the court of the Frankish king Theodoric, and afterward in that of Pippin of Heristal. His death occurred in 727, and in 825 his remains were removed to a Benedictine cloister in the Ardennes, which thenceforth bore his name, and ultimately became a considerable resort of pilgrims.

HUBLI, a town in Dhárwár district, Bombay, situated thirteen miles southeast of Dháwár, on the main road from Poona to Harihar ; it is 230 miles southeast from Poona, 142 miles from Bellári, 90 miles from Kárwár, and 97 miles from Kumpta. Pop. (1901), 58,149.

HUC, Évariste Régis, a celebrated French missionary-traveler, was born at Toulouse, August 1, 1813. He died March 31, 1860.

HUCBALD was born in or about 840, if we may believe the statement of his biographers to the effect that he died in 930, aged 90. Of his life little is known;

not even the place of his birth can be ascertained, but he was no doubt a Frenchman or a Belgian. Between 883 and 900 Hucbald went on several missions of reforming and reconstructing various schools of music, including that of Rheims, but in the latter year he returned to St. Amand, where he remained to the day of his death (June 25, 930, or, according to other chroniclers, June 20, 932), and where his most important works on music were written.

HUCHTENBURG. Two brothers of this name practiced the art of painting in the second half of the seventeenth century. Both were natives of Haarlem. Jacob, the elder, of whom very little is known, studied under Berghem, and went early to Italy, where he died young about 1667.

John van Hutchenburg (1646–1733), born at Haarlem, it is said, in 1646, was first taught by Thomas Wyk, and afterward induced to visit the chief cities in Italy, where, penetrating as far as Rome, he met and dwelt with his brother Jacob. After the death of the latter he wandered homeward, taking Paris on his way. When he died in Amsterdam in 1733, Huchtenburg had done much by his pictures and prints to make Prince Eugene, King William, and Marlborough popular.

HUDDERSFIELD, a municipal and parliamentary borough and market-town of England, in the West Riding of Yorkshire, is beautifully situated on the slope of a hill in the valley of the Colne, a tributary of the Calder, fifteen miles south of Bradford, and sixteen and one-half miles southwest of Leeds. Pop. (1901), 95,008.

HUDSON, a city of the United States, capital of Columbia county, N. Y., is situated on the left bank of the Hudson river at the head of navigation, 114 miles north of New York city. The city is for the most part regularly built, with streets crossing each other at right angles. The city is well supplied with schools, and possesses three public libraries. Hudson at one time vied as a trading port with New York, and, although both its West India trade and its whale fishing have now been abandoned, it still carries on an important river trade, and has regular steam communication with New York and Albany. It also possesses large iron smelting works, a stove-foundry, a tannery, a flour-mill, breweries, iron-foundries, and factories for pianos, carriages, paper, car wheels and steam fire-engines. The population. which in 1870 was 8,615, was 8,619 in 1880, and 9,528 in 1900.

HUDSON RIVER, or NORTH RIVER, one of the largest and noblest rivers of the United States, and the principal river of the State of New York, is formed by the confluence of two small streams which rise in the Adirondack mountains in Essex county. About the middle of Warren county the river is joined by another of nearly equal size, the Schroon, which also has its rise in Essex county. After receiving the Sacondaga river ten miles further south, the Hudson flows irregularly in an easterly direction to Sandy Hill, after which it keeps a very straight course almost due south until it falls into New York Bay. At Troy it receives the Mohawk, whose volume of water is greater than its own, and at Kingston the Wallkill, but its other tributaries, though numerous, are unimportant. Its total length is about 300 miles, and the length of its course from Sandy Hill 190 miles. At Glen's Falls, near Sandy Hill, it makes a precipitous descent of fifty feet, whence there are various rapids of different velocities until it reaches Troy. It is tidal nearly up to Troy, and the fall from Albany, six miles below Troy, to the mouth of the river, a distance of 145 miles, is only five feet. By means of a lock and dam it is navigable to Waterford, a short distance above Troy, but large steamers do not proceed further up than Hudson, twenty-nine miles below Albany, and 116 from the mouth of the river. A short distance below Albany the navigation has been obstructed by shifting sands, the point at which the difficulties are most formidable being the "overslaugh" at Castleton, but extensive operations have been for some time carried on in order to effect a permanent remedy for the obstructions. The breadth of the river at Albany is about 300 yards, and thence to Haverstraw, distant thirty-four miles from New York, it varies from 300 to 900 yards. From Haverstraw to Piermont it expands into Tappan Bay, with a length of twelve miles and a breadth of from four to five, after which it narrows to a breadth of between one and two miles. The scenery of the river is for the most part varied and beautiful, generally picturesque, and in many places in the highest degree striking and magnificent. In the upper part the views, though not tame, are a little monotonous, the gently sloping hills, with the variegated colors of wood and cultivated land, and the occasional occurrence of a town or village, repeating one another without any marked feature to break their regularity. Below Troy, for a considerable distance, the number of islands renders much care in navigation necessary. Thirty miles from Troy noble views begin to be obtained of the Catskill mountains towering up on the west bank, the nearest eminence at the distance of about seven miles. Forty-six miles below Catskill is the large and flourishing city of Poughkeepsie, fourteen miles further down the prosperous city of Newburgh, a short distance below which, at the favorite summer resort of Cornwall Landing, the river enters the Highlands, passing between a series of hills whose frequently precipitous sides rise often abruptly from the water's edge. The views in this part of the river are of a character in some respects unparalleled, and at several points they have an impressiveness and surprising grandeur rarely equaled. The distance through which the river traverses this mountain scenery is about sixteen miles, and about ten miles after it is entered West Point is reached, a favorite landing place of tourists, the seat of the United States military academy, and historically interesting on account of Fort Putnam, now in ruins, built during the war of American independence, at which time a chain was stretched across the river to prevent the passage of British ships. After passing the pretty town of Peekskill the river widens into Haverstraw Bay, at the extremity of which is the headland of Croton Point. Below is the wider expanse of Tappan Bay, upon which stands Tarrytown, famous both historically and from its connection with Washington Irving, whose cottage of Sunnyside is in the vicinity. At Piermont, where the bay ends, the range named the Palisades rises picturesquely from the water to the height of 300 and 500 feet, extending along the west bank for about twenty miles, the left bank being level and dotted with hamlets and villas. At the mouth of the river on the west bank are Hoboken and Jersey City, and on the east bank New York city.

By the Erie canal the river is connected with Lake Erie, by the Champlain canal with Lake Champlain, and by the Delaware canal with the Delaware river; and its commercial importance as a means of traffic is not excelled by that of any other river in the world. It was on the Hudson that Fulton, the inventor of steam navigation, made his first successful experiment. The Hudson River Railway skirts the east bank of the river from New York to Troy, whence it bends eastward on its way to Lake Champlain. On the west bank a railway runs from Jersey City to Albany, and branch lines from various centers touch both banks at several points. The Hudson has some valuable fisheries, the principal fish being bass, shad and sturgeon. The attempts to stock it with salmon have not been very successful.

Though Verrazzani in 1524 proceeded up the river Hudson a short distance in a boat, the first to demonstrate its extent and importance was Henry Hudson, from whom it derives its name. He sailed above the mouth of the Mohawk in September, 1609.

HUDSON, GEORGE, the English "railway king," was born in York in 1800, was a successful linen draper in that city, and subsequently became the leading representative of the railway mania of 1845-46. Elected chairman of the North Midland Company, he was for three years the ruling spirit of speculation and as the arbiter of capital held the key of untold treasures. All classes delighted to honor him, and, as if a colossal fortune were an insufficient reward for his public services, the richest men in England presented him with a tribute of £20,000. Full of rewards and honors, he was suddenly ruined by the disclosure of the Eastern Railway frauds. His later life was chiefly spent on the Continent, where he benefited little by a display of unabated energy and enterprise. Some friends gave him a small annuity a short time before his death, which took place in London, December 14, 1871.

HUDSON, HENRY, a distinguished English navigator, of whose personal history before April 19, 1607, or after June 21, 1611, absolutely nothing is known, and whose well-earned fame rests entirely on four voyages which were all unsuccessful as regarded their immediate object, the discovery of a commercial passage to China other and shorter than that by the Cape of Good Hope. Of the first two voyages it is needless to speak, as they were barren of any particular result.

In the autumn of 1608 Hudson "had a call" to Amsterdam, where he saw Plancius, who gave him Waymouth's journals, and Hondius, who supplied him with translations of certain Dutch papers. After some vacillating negotiations he finally undertook for the Dutch East India Company his important third voyage to find the passage to China "by the east or the west." With a mixed crew of eighteen or twenty men he left the Texel in the *Half-Moon* on April 5th, and by May 5th was in the Barrentz Sea, and soon afterward among the ice near Costin Sareh in Nova Zemla, where he had been the year before. Some of his men becoming disheartened and mutinous (it is now supposed that he had arrived two or three months too early), he soon lost hope of effecting anything by that route, and submitted to his men, as alternate proposals, either to go to Lumley's Inlet and follow up Waymouth's light, or to make for North Virginia and seek the passage in about 40° latitude, according to the letter and map sent him by his friend, Capt. John Smith. The latter plan was adopted, and on May 14th Hudson set his face toward the Chesapeake and China. He touched at Stromo for water, and on June 15th off Newfoundland in about 48° latitude the *Half-Moon* "spent overboord her foremast." This accident compelled him to put into Sagadahoc (44° 1′ latitude), where on July 18th a mast was procured, some communication with the Indians was had, and an unnecessary battle fought, in which the ship's two "stone murderers" were employed. Sailing again on July 25th, he was off Cape Cod on August 6th, and on the 9th (38° 39′ latitude) "went with low sail because we were in an unknown sea." On August 18th they made Smith's Islands, six or seven miles north of the entrance to the Chesapeake. On August 28th, beginning the survey where Smith left off at 37° 36′ according to his map, he coasted north to Sandy Hook, passing the "overfall" of the Delaware with scarcely any notice, probably because a western inlet there would have taken him in amid Smith's surveys. On September 3d, in 40° 30′, he entered the fine bay now known by the name of New York. After having gone 150 miles up what is now the Hudson river, treating with the Indians, surveying the country, and trying the stream above tidewater, he became satisfied that this course did not lead to the South Sea or China, a conclusion in harmony with that of Champlain, who the same summer had been making his way south through Lake Champlain and Lake St. Sacrement to the South Sea. The two explorers by opposite routes approached within twenty leagues of each other. On October 4th the *Half-Moon* weighed for the Texel, and on November 7th put into Dartmouth, where she was seized by the English Government and the crew detained. The voyage had fallen short of Hudson's expectations, but it served many purposes perhaps as important to the world. Among other results it exploded Hakluyt's myth, which from the publication of Lok's map in 1582 to the third charter of Virginia in May, 1609, he had lost no opportunity of promulgating, that near 40° latitude there was a narrow isthmus, formed by the sea of Verrazano, like that of Tehuantepec or Panama.

Hudson's three failures served only to increase men's confidence in the existence of a passage by the northwest, for the discovery of which a new and strong joint-stock company was accordingly formed. The command was given to Hudson, who, on April 10, 1610, sailed in the *Discoverie* of seventy tons, the ship that took Waymouth in 1602 in the same direction. How he penetrated through the long straits, discovered the great bay that bears his name, at once his monument and his grave, how he and his men wintered in its southern extremity, how in coming north in the next summer, near the east coast, half way back to the straits, he, his son, and seven of his men, in a mutiny, were put into a shallop and cut adrift on Midsummer day, 1611, is told in many books. The ringleaders and half the crew perished miserably, but the *Discoverie* was finally brought home to London. No more tidings were received of Hudson, but no one doubted the complete success of his voyage. A grander company was incorporated in 1612, under Prince Henry, to complete the exploration of the passage, and to find the lost discoverer and his companions. Sir Thomas Butler was the commander in 1612, and the *Discoverie* was again the chosen ship. In 1613 the voyage was repeated by Gibbons, and once more in 1614 by Baffin; and the bay was thoroughly explored with the results which have long been universally familiar.

HUDSON'S BAY COMPANY is a joint-stock association formed for the purpose of importing into Great Britain the furs and skins which it obtains, chiefly by barter, from the Indians of British North America. The trading forts of the company are dotted over the immense region (excluding Canada Proper and Alaska) which is bounded east and west by the Atlantic and Pacific Oceans, and north and south by the Arctic Ocean and the United States. From these forts the furs are dispatched by boat or canoe to York Fort on Hudson's Bay, whence they are shipped to England to be sold by auction.

In the year 1670 Charles II. granted a charter to Prince Rupert and seventeen other noblemen and gentlemen, incorporating them as the "Governor and Company of Adventurers of England trading into Hudson's Bay." The first settlements in the country granted, which was to be known as Rupert's Land, were made on James' Bay and at Churchill and Hayes rivers; but it was long before there was any advance into the interior. Although the commercial success of the enterprise was from the first immense, great losses were inflicted on the company by the French, who sent several military expeditions against the forts. After the cession of Canada to Great Britain in 1763, numbers of fur-traders spread over that country, and into the northwestern parts of the continent, and began even to encroach on the Hudson's Bay Company's territories. These individual speculators finally combined into the North-West Fur Company of Montreal, of which Washington Irving has given an interesting description in his *Astoria*. The fierce competition which at once sprang up between the companies was marked by features which sufficiently demonstrate the advantages of a monopoly in commercial dealings with savages, even although it is the manifest interest of the monopolists to retard the advance of civilization toward their hunting grounds. The Indians were demoralized, body and soul, by the abundance of ardent spirits with which the rival traders sought to attract them to themselves; the supply of furs threatened soon to be exhausted by the indiscriminate slaughter, even during the breeding season, of both male and female animals; the worst passions of both whites and Indians were inflamed to their fiercest, and costly destruction of human life and property was the result. At last, in 1821, the companies, mutually exhausted, amalgamated, obtaining a license to hold for twenty-one years the monopoly of trade in the vast regions lying to the west and northwest of the older company's grant. In 1838 Hudson's Bay Company acquired the sole rights for itself, and obtained a new license, also for twenty-one years. On the expiry of this, it was not renewed, and since 1859 the district has been open to all, the Hudson's Bay Company having no special advantages beyond its tried and splendid organization. The licenses to trade did not of course affect the original possessions of the company. These it retained till 1869, when they were transferred to the British Government for £300,000 ($1,500,000); in 1870 they were incorporated with the Dominion of Canada. The company, which now trades entirely as a private corporation, still retains one-twentieth of the entire grant, together with valuable blocks of land around the various forts; and these possessions will doubtless, as the country becomes opened up and colonized, yield a considerable revenue at some future time.

HUÉ, or HUE-FOO, the capital of the kingdom of Anam, is situated in a province of its own name, on the left bank of the Truòng-Tiên or Hué river, which falls into the Chinese sea about eight miles further down. Population, 30,000.

HUELVA, one of the eight provinces into which Andalucia has since 1833 been divided, is bounded on the north by Badajoz, on the east by Seville, on the south and southwest by the Atlantic, and on the west by Portugal, and has an area of 4,122 square miles. With the exception of its southeast angle, where the province merges into the flat waste lands known as Las Marismas of the Guadalquivir, Huelva presents throughout its entire extent an agreeably varied surface, being traversed in a southwesterly direction by the western spurs of the Sierra Morena. Pop., 253,970.

HUELVA, the capital of the above province, is situated on the western shore of the triangular peninsula formed by the estuaries of the Odiel and Tinto, fifty-three miles west-by-south of Seville. Population, 18,915.

HUESCA, one of the three provinces into which the old northern Spanish kingdom of Aragon was divided in 1833, is bounded on the north by France, east by Lerida, south and southwest by Saragossa, and west and northwest by Navarre. The total area is 5,878 square miles. The surface is mountainous, especially in the north, which is occupied by the lofty offshoots of the Pyrenees, which there reach, in Monte Perdido, the height of 11,430 feet. Pop. (1898), 238,935.

HUESCA, chief town of the above province, and the seat of a bishop, is pleasantly situated on an eminence commanding an extensive view over the surrounding fertile plain. Population, 13,043.

HUESCAR, chief town of a judicial district in the Spanish province of Almeria, is situated in a plain, surrounded by mountains on three sides, about ninety-one miles northeast of Granada. Population, 7,760.

HUET, PIERRE DANIEL (1630–1721), bishop of Avranches, is the last of those encyclopædic and massive scholars of whom France produced so many. He left no successor to his omnivorous learning, prodigious memory, and indomitable energy. It was at the age of forty-six that he took orders, a step which he had contemplated for some years. Two years later the king gave him the abbey of Aunay, where he wrote his *Questions d'Aunay, sur l'accord de la Foi et de la Raison*, his *Critique de la Philosophie de Descartes*, his *Memoires pour servir à l'Histoire du Cartésianisme*, his dissertation on the site of the terrestrial paradise, and his discussion with Boileau on the Sublime. At length he retired to the Jesuits' House in the Rue Saint Antoine at Paris, where he ended his days, in 1721.

HUFELAND, CHRISTOPH WILHELM, a distinguished physician and writer on medical subjects, was born at Langensalza, August 12, 1762. He died at Berlin in 1836.

HUFELAND, GOTTLIEB, a distinguished writer on political economy and law, was born at Dantzic on October 19, 1760. At Halle he died in February, 1817.

HUG, JOHANN LEONHARD, Roman Catholic theologian and Biblical critic, was born at Constance, where his father was a locksmith, on June 1, 1765. He was seized with a painful illness, in 1845, which proved fatal on March 11th of the following year.

HUGH, ST., OF AVALON (*c.* 1135–1200), bishop of Lincoln, was born of a noble family at Avalon, near Pontcharra in Burgundy, about 1135. He died at London, on November 16, 1200.

HUGH OF ST. CHER, Hugo (Ugo) de S. Caro or Carensis, a learned compiler of the thirteenth century, was born at St. Cher, a suburb of Vienne, Dauphiné, about the year 1200. He died at Orvieto in 1263.

HUGH OF ST. VICTOR, Hugo a S. Victore, sometimes also known as Hugh of Paris, was born probably in the neighborhood of Ypres, about 1097. He died in 1141.

HUGUENOTS, THE. The word Huguenot first appears in France about the middle of the sixteenth century, and there is historical proof that it was imported from Geneva, where it had existed for some time as a political nickname in a form which connects it directly with the German-Swiss *Eidgenossen*, oath-comrades, confederates. In France it was used as a term of reproach for those who aimed at a reform of religion according to the pattern displayed by Calvin in his famous *Institutio Christianæ Religionis*. The name attached itself to the Reformers when, having shaken off all connection with Lutheranism, they were beginning to organize themselves both as a church and as a political body. The Lutheran ideas, which had early come into northern France by way of Metz and Meaux, had for a short time seemed likely to prevail at the court of Francis I., where the king's love of culture welcomed whatever came from the land of the learned; the genius of Erasmus, or the sharp satire of Hutten, or Luther's weighty tractates, all seemed to him at first to be so many protests against the darkness of a monkish past; the hymns of Marot, the bright poetry of Margaret of Valois, the king's sister, harmonized not ill with the desire for a humanist reform which prevailed at the French court. But when the destructive enthusiasm of the artisans who embraced the new opinions, breaking out in attacks on the art-treasures of the churches, alienated the royal moderates, the simpler and more marked theology of the "Sacramentarians" of Geneva quietly replaced the Lutheranism of the first Reformers; and by the middle of the sixteenth century the new Huguenots were an unpopular party, drawing their inspiration from Calvin, and bitterly disliked by the court and the bulk of the people of France. The persecutions, varied by protection, of the reign of Francis I. had given place to a vehement desire to crush the rising heresy; the character of Henry II. and his chief advisers led them toward a thorough persecution.

Influenced by these repressive measures, and taught by Calvin's book and his frequent letters, the French Reformers now began to organize their infant churches. Hitherto they had been content to meet in quiet, to sing Marot's psalms, to listen to earnest prayer and practical discourse in some lowly chamber, deferring questions as to church government; now their ecclesiastical system began to develop itself. In 1555 the first Protestant French church was established at Paris, and almost immediately there sprang up fifteen communities, the largest being at Meaux, Poitiers, and Angers, each having its pastor, elders, and deacons, each ruling itself, and recognizing no common bond of union save that of charity and suffering. These were the heroic days of the Huguenot movement in France, each little church striving only to fulfill the simplest ideal of Christian faith and practice, happiest when least observed, purest when least developed. Three influences had hitherto acted on French religious feeling—that of the Lutherans, that of the ancient Vaudois churches of southeastern France, represented by Faber, and lastly that of Calvin of Noyon, the Picard exile settled at Geneva. Now a fourth element came in; resistance had elicited organization, organization demanded leadership; and, unhappily for France and the Huguenots, the movement fell too much into the hands of secular chiefs, great lords who used it for their own political and selfish purposes.

In 1559 the churches of the Huguenots met in a first synod at Paris, eleven sending representatives. This body drew up a confession of faith, which bears throughout the mark of Calvin's hand, in its scrupulous orthodoxy, strong statements as to God's election of some to eternal life, and careful definitions of the nature and structure of the church; the synod also issued a scheme of discipline to which the churches were all to conform. No church should take lordship over any other (a church being a single community under one pastor). Each "colloque" or synod should have a freely-elected president; every pastor should come to the colloque, bringing each at least one elder or deacon from his church; this body was to meet at least twice a year; new pastors were to be appointed by it to vacant churches, on presentation by the elders and deacons; minute rules were laid down for church discipline; it was ordered that provincial synods should be held in each province, and finally that there should be from time to time a general or national synod of representatives of the whole body.

Two years later the civil war broke out (see FRANCE), and lasted over thirty years. At the beginning of this period we have some data as to the Huguenot strength: Beza tells us that in 1558 there were 400,000 of them; a list presented by Condé to Catherine de' Medici is said to have contained the names of 2,150 (some say 2,500) churches; and it is probable that the number of their open adherents had increased rapidly. John Correro, Venetian envoy in 1569, says that only one-thirtieth of the common folk, but one-third of the nobles, were Huguenots, for the strength of the movement had undoubtedly come to lie in the noblesse. The list of the Huguenot churches given by Haag provides us with data as to their distribution in France. The two centers were Languedoc in the south, and the Orléanais in the middle of the country; and a line drawn northwest to southeast through a point half way between Paris and Orleans would nearly give the northern limit of Huguenot success. Normandy, thanks to the Châtillon influence, had many churches; in Orleans and Burgundy they were well represented. In Guyenne and throughout western France they had numerous communities. The little independent principality of Béarn, through the influence of Jeanne d'Albret, Henry IV.'s mother, was entirely Huguenot. On the other hand, though there were some churches in the Île de France and Champagne, they had little hold there; and Picardy was from the first profoundly hostile to them, while Paris became the headquarters of the Catholic League. Their churches sprang up with wonderful quickness at this time; thus we see that all the seventy-six congregations in Languedoc named by Haag were established between 1558 and 1562. All were characterized by a like aptitude for organization; their constitution, simple and popular, is a proof that under better auspices the French people might have well exercised the privileges of constitutional liberty; the Huguenots had a popular representation and frequent deliberative assemblies. Between 1559 and 1598 they held fifteen general church synods, and from 1573 to 1622 many political assemblies, in which all questions bearing on the interests of the "cause" were debated and decided.

The subordination of the religious to the political interests of the Huguenots became inevitable after the massacre of St. Bartholomew's day, 1572; while at the same time their organization assumed a more decidedly republican tone. The horror they felt at the violent action of Charles IX. seemed to free them from all allegiance to him; they looked to England and Germany for help, to Switzerland and the United Provinces for encouragement and political example. They at once drew up an independent constitution, democratic and federative, framed chiefly after the Swiss pattern. Like all other attempts at a republican form of government, it had an aristocratic and a democratic side, the latter for the time seeming to be the stronger. For the center of their power was now passing from the aristocracy to the burghers, from country chateaux to provincial towns. In the towns the only distinction recognized was that of pastor and elders, and these might be, and mostly were, men of the people, chosen by the people. The great nobles who sided with them, the "Politique" princes like Alençon or Damville-Montmorency, winked for a time at this new "state within the state," the germ of that Huguenot organization which later on hampered Richelieu's path. Their system was based on the towns in their hands. In each an independent government was elected by popular suffrage, and was composed of a mayor, a council of twenty-four, and an elective chamber of seventy-five citizens, making up in all a hundred rulers. This body was a court of justice, with some amount of sovereignty. Thus, the twenty-four with the mayor had control over war, police, and "things of highest importance," though without the seventy-five they could neither pass nor abrogate laws, as to coin, taxation, truces, or terms of peace. The mayors and privy councils of the confederate towns were charged with the election of a general, a kind of Roman dictator, who was to have both a council to advise him and also five lieutenants to help and succeed him, if need were. Lastly, provision was made for a strict moral discipline.

Soon after this the Huguenots established a system of "generalities" or districts, each with its own local estates, and over these provincial councils and a states-general, thus materially strengthening their independent organization. This system continued throughout the league wars (1574–1589), during which the religious movement was controlled by a knot of selfish political leaders, and in the course of which their point of view completely changed : for, while in the beginning they had passionately called for popular institutions and the convocation of the states-general of France, in the end they became the followers of Henry of Navarre, as heir to the French crown, representative throughout of the anti-popular temper of the Bourbon house. Under him the discontented Huguenots again reorganized themselves into nine great circles, over each of which was a council of from five to seven members, elected by delegates from the churches, and having the duty of laying their independent taxation, of levying, commanding, and paying their own troops. There was also a general assembly for all the circles (after the pattern of the United Provinces) sitting in three estates — pastors, nobles, burghers; the whole polity being representative as an aristocratic republic. This general assembly sat frequently, sent embassies to foreign powers, sometimes acting as an independent body politic.

The discontent of the Huguenots at last extorted from Henry IV. the famous edict of Nantes (May 2, 1598), a document which in the main only reproduced the more favorable of the earlier edicts. Its provisions were at least as helpful for Catholics as for Protestants ; it was always being so modified as to show less and less favor to the Calvinists, who were little satisfied with it. They had dreamed of dominance, had hoped for equality, and were now put off with tolerance. For whatever Henry IV. might feel about their faith, he was determined, as he once told Sully, "to reduce to nothing the Huguenot faction," to destroy their political independence, and by closing up the civil strife to secure the solid establishment of the central monarchy. The edict allowed public exercise of the Huguenot faith in the houses of nobles and gentry, and in a few named towns ; it gave the sectaries full civil rights, and made them eligible to all civil offices; in several parliaments mixed chambers were established ; the education of their children was left in their own hands.

We find that about 1590 the Huguenots had exercise of their worship in about 3,500 chateaux, and in about 200 towns or bourgs, chiefly in the south and west. In most parts of the north, except Paris and around Rouen and Amiens, they had one place for worship in each bailliage or sénéchaussée. In 1598 existed a list of about 150 places granted by Henry IV. to the Huguenots for their safety, the chief groups being in the generalities of Bordeaux and Montpellier, and in Poitou; these were either free towns, like La Rochelle, Nîmes, Montauban, or towns belonging to private gentlemen, or towns belonging to the king, which had fallen into Huguenot hands during the wars.

Throughout the next quarter of a century we trace their history in a series of outbursts, indicating noble impatience and Calvinistic dissatisfaction. The siege and fall of La Rochelle (1627–1628) brought this period to an end. During this time their number seems to have increased; at the accession of Louis XIII. they had about 500 churches; in 1622 and 1628 we have lists of 688; in 1637 no less than 720 are enumerated, though of these forty-nine were either vacant or suspended. Richelieu and Mazarin treated them with statesmanlike prudence; their synods were discouraged, their grumblings ceased; they grew in piety and purity as the political arena was closed to them, and the noble houses one by one deserted them. This was the time of their material prosperity, and of their important contribution to the welfare of France, which Louis XIV. so rudely cast away.

As that king got hold of his power, the tranquillity of the Huguenots waned. In 1657 they were forbidden to hold colloquies, lest perchance they should take to politics; in 1659 they were practically told to hold no more synods. Soon the court went further: conversions were undertaken. Wherever a pastor could be bribed, won over, or got rid of, his "temple" was at once torn down; the Huguenot worship became almost impossible in towns, and lingered on in a few castles, whereby it fell still more under the royal displeasure. As his conscience grew morbid, under Madame de Maintenon's direction, Louis XIV. became more eager to expiate his own crimes by punishing the heretics. Between 1657 and 1685 520 churches were rooted up; Anquetil declares that 700 had been destroyed before 1685. All through this period, while thousands yielded to oppression or bribery, thousands also fled the land; the emigration began in 1666 and went on for fifty years. It is probable that in 1660 there were over 2,000,000 of Huguenots, the best and thriftiest citizens in the land; it is said, though no figures can be trusted, that in all fully a million of French subjects escaped from their inhospitable fatherland. At last in 1685, thinking that the Huguenots were as good as suppressed, Louis XIV. revoked the edict of Nantes. The revocation was the sentence of civil death on all Huguenots; it crushed more than half the commercial and manufacturing industry of the kingdom. It is said that at the time of it there were 1,000 Huguenot pastors; of these over 600 escaped from France, 100 were slain or sent to the galleys, the remainder conformed or disappeared.

The war of 1689 called attention away from the persecuted remnant of the Huguenots, and they had a breathing space in Languedoc, the Cevennes, and Dauphiné; but directly the peace of Ryswick was signed, repression began again, and consequently, when the Spanish succession war commenced, the Huguenots of the "Desert," that is, of the country about Nîmes, broke out after endless provocations into open war, which lasted two years, and for a while defied all the efforts of the court. Marshal Villars was at last sent down, and by mingled gentleness and severity he both secured the submission of the gallant Cavalier, the chief leader of the Huguenots, and the defeat of the more determined of the mountaineers. Throughout the rest of the century the downtrodden Protestantism of France was kept alive chiefly by the exertions of Antoine Court, the apostle of the Desert, who never lost faith in the cause, and who reorganized the dying churches, breathing into them fresh life. Though under the influence of oppression and excitement, the Huguenot story is here and there disfigured by fanatical outbursts of the "prophets" and "prophetesses," still on the whole the account of their endurance is among the most remarkable and heroic records of religious history.

After the interference of Voltaire in behalf of Calas, their sufferings came almost to an end; the general change of opinion, the steady weakening of the Catholics, the indolence or good nature of the sovereign, forbade the scandals of the past, until at last in 1787, under Necker's influence, Louix XVI. signed a memorable edict which restored, after 102 years' deprivation, their civil status to the Huguenots. The Revolution of 1789 carried justice a stage further; among the many titles of the Revolution to the gratitude of posterity none is more marked than the complete restoration of the non-Catholic elements of French society to their rights. From that moment to the present time the descendants of the Huguenots have had peace.

There are now about half a million Calvinists in

France; in the Gard, the ancient Desert, nearly a quarter of the whole body still abide. Of late years the Protestant Church in France has shown a tendency to division into two parties, that of the more rigid Calvinistic opinions, and that of a more liberal and less orthodox theology. In either case they form a group of loyal citizens, on whom French politicians now look with favor. The old reproach that "the Huguenots are all republicans" has at last turned to their credit.

The persecutions which checked all wholesome developments at home, whether religious, literary or commercial, were favorable to their growth abroad; and we consequently find that in literary and artistic excellence the Huguenots have taken their full share. Their first attention was naturally called to theology, in which the names of Calvin and Farel, Beza, Daillé, the Drélincourts, the learned S. Desmarets, Jortin, P. Jurieu, Labadie the mystic, the Leclercs, the great Hebraist Mercier, Mestrezat the preacher, the old hero Duplessis Mornay, Salmasius, J. Saurin, first of Protestant orators, and a crowd of lesser men testify to their activity in this branch. Add to these the dictronary of Bayle, the works of the Basnages, Morin the Orientalist, Pithou, the Daciers, Étienne Dolet, Ranius, Le Févre of Étaples, above all Scaliger, as leaders in learning; in history Bénoît, Bongars, Palma Cayet, Hubert Languet, Béroalde, and Rapin-Thoyras; and with them the political writer Hotman. Of lawyers they claim Baudouin, Cujas, Coras, Doneau, Hérault, and Godefroy, famed as the most learned of jurisconsults. In science they have the Cuviers, Desmaizeaux, Dubois the chemist, Paré, father of modern surgery, Papin, herald of the steam engine, the physician Joubert, L'Ecluse the botanist, and the Hübers. In art they lay claim to Crispin, J. Cousin, Pallissy, Simon the engraver, the Picarts, and Goujon the architect. Their poets are Marot and Margaret of Valois. The general effect of this activity is hard to gauge: from Amsterdam and Berlin, Geneva and London, issued sermon, political pamphlet, controversial polemic; but these efforts had no settled audience, they failed to win the ear of France. The same is true of their religious heroism; though it seemed to be exactly what was wanted to strengthen the national character, the confessors were scattered, like the Jews, among the nations, and ceased to affect the progress of their fatherland. In the Revolution we can see traces of their mental and moral activity; it may be that their day of influence is not yet over. For their history is a standing marvel, illustrating the abiding power of strong religious convictions, narrow in theory, pure in practice; they have stood as much ill-usage as has befallen any branch of Christ's church. It remains for their descendants to show to France that their creed goes well with freedom and advance—that the religious instinct, so deeply implanted in man, is a true friend of orderly and rational national life. Religion which does not abuse its power, a freedom from divided allegiances, an aptitude for constitutional institutions, and an intelligent belief in the sovereignty of the people—these are the elements which the Huguenots of to-day can bring to the service of the republic under which they dwell safely, none making them afraid.

HULL, or KINGSTON-UPON-HULL, a municipal and parliamentary borough, and one of the principal seaport towns of England, is, though a county in itself, locally within the East Riding of Yorkshire, on the west side of the Hull, where it discharges into the estuary of the the Humber, twenty miles from the German Ocean at Spurn Head. By rail it is forty-one and one-half miles east-southeast of York.

The staple industry of Hull is seed-crushing for oil and cake making. It possesses extensive engineering works and foundries, large iron shipbuilding yards, rope-yards, sail-lofts, tanneries, breweries, flax and cotton mills, chemical works, and manufactures of blue and black lead, paints, colors, and varnishes, Portland and Roman cement, phosphate of lime, tobacco, starch, paper, soap, furniture, and organs. Population (1901), 240,618.

HULL, the chief town of Ottawa county, Quebec, is situated on the Ottawa river, opposite Ottawa City. The chief industries are woolen mills, planing mills, match, pail and wooden-ware factories, all of which are run by water power, which is here in great abundance. The Chaudiere Falls, a magnificent cataract, is spanned at this point by a handsome suspension bridge. Iron mines in the vicinity are worked. Pop. (1901), 13,993. The city has good railroad communications.

HULS, a town of Prussia, in the circle of Kempen, and goverment district of Düsseldorf, is situated at the terminus of a branch railway line to Crefeld and Düsseldorf, four miles north of Crefeld and seventeen northwest of Düsseldorf.

HULSE, JOHN, founder of the Hulsean lectureship at the university of Cambridge, was born at Middlewich, in Cheshire, in 1708. Entering St. John's College, Cambridge, he graduated in 1728, and on taking holy orders was presented to a small country curacy. His father having died in 1753, Halse succeeded to his estates in Cheshire, where, owing to feeble health, he lived in retirement till his death in 1789.

HUMBLE-BEE, a name applied by phonetic instinct, under various inflections, to the large bees of the genus *Bombus* (which, like the French "Bourdon," is probably also suggested by the noise made by these insects). They belong to the social section of the great family *Apidæ*, of which the common hive-bee is the type, and, like that well-known insect, live in colonies composed of the two sexes and neuters. Instead of a single female (or queen), however, many are found in one nest; and the workers do not hibernate. The female also differs from the queen hive-bee in having dense fringes of hairs on the pollen-plates of the hind legs, and a widened base to the hind tarsi, a structure necessitated by her having to work single-handed at the commencement of the season, as the workers and males do not survive the winter. There are two kinds of females, the smaller one only producing male eggs, but not surviving the winter. The number of individuals in a colony varies with the different species, and as a rule is least in those building their nest above ground. There is considerable difference between the males, females and neuters; the last two differ, however, but little except in size, whereas the males often exhibit a very varying coloration, and have structural peculiarities, such as an additional segment to the abdomen, longer antennæ and tongue, no pollen-basket, etc. They have also no sting, whereas both female and worker are armed like the hive-bee. Great difficulty exists in referring these three constituents to their proper species, owing to individual variation, alteration with age, and the difficulty of seeing all the members of a colony at the same time; so that naturalists are not by any means agreed as to the specific status of many of them, and the synonymy is very complicated. The nests are not constructed after the symmetrical fashion of those of the hive-bee, but consist of a collection of oval brownish cells, at first few in number, but receiving additions and extensions as the brood increases, and accompanied by cells containing pollen and honey. The workers assist in rearing the larvæ, and in disengaging the individuals from the pupal integuments as they reach the perfect state; and it has been noticed that this metamorphosis is accelerated by a kind of incubation.

The nests are made under bushes, in banks, etc., sometimes as much as five feet from the surface. A well-known one is made by the "Moss-carder" humble-bee, *Bombus muscorum*, which has often been observed collecting the natural material for its dome, working in line. As usual with provident or social animals, these interesting insects are subject to encroachment by parasites of various kinds; most noteworthy among which are some species (there are three or four in England) of the closely allied genus *Apathus* (or *Psithyrus*), superficially resembling exactly the true humble-bees, but with no pollen-collecting apparatus, and no workers.

HUMBOLDT, a river of Nevada, rises in the northeast part of the State, and flows west-southwest to Humboldt Sink, a lake over forty miles in circumference, which has no outlet. Length, nearly 350 miles. The river, which is unnavigable even for canoes, is strongly impregnated with alkaline matter. The region through which it flows is barren.

HUMBOLDT, Friedrich Heinrich Alexander, Baron von, a distinguished naturalist and traveler, was born at Berlin, September 14, 1769. The childhood of Alexander von Humboldt was not a promising one, as regards either health or intellect. His characteristic tastes, however, soon displayed themselves. Destined for a political career, he studied finance during six months at the university of Frankfort-on-the-Oder; and a year later, April 25, 1789, he matriculated at Göttingen. His vast and varied powers were by this time fully developed; and during the vacation of 1789 he gave a fair earnest of his future performances in a scientific excursion up the Rhine, and in the treatise thence issuing, *Mineralogische Beobachtungen über einige Basalte am Rhein* (Brunswick, 1790). His researches into the vegetation of the mines of Freiberg led to the publication, in 1793, of his *Floræ Fribergensis Specimen;* and the results of a prolonged course of experiments on the phenomena of muscular irritability, then recently discovered by Galvani, were contained in his *Versuche über die gereizte Muskel- und Nervenfaser* (Berlin, 1797), enriched in the French translation with notes by Blumenbach.

In 1794 he was admitted to the intimacy of the famous Weimar coterie, and contributed (June, 1795) to Schiller's new periodical *Die Horen*, a philosophical allegory entitled *Die Lebenskraft, oder der rhodische Genius.* In the summer of 1790 he paid a flying visit to England in company with Forster. In 1792 and 1797 he was in Vienna, in 1795 he made a geological and botanical tour through Switzerland and Italy. The death of his mother, November 19, 1796, set him free to follow the bent of his genius, and, finally severing his official connections, he waited for an opportunity of executing his long-cherished schemes of travel. On the postponement of Captain Baudin's proposed voyage of circumnavigation, which he had been officially invited to accompany, he left Paris for Marseilles with Bonpland, the designated botanist of the frustrated expedition, hoping to join Bonaparte in Egypt. The means of transport, however, were not forthcoming, and the two travelers eventually found their way to Madrid, where the unexpected patronage of the minister d'Urquijo determined them to make Spanish America the scene of their explorations.

Armed with powerful recommendations, they sailed in the *Pizarro* from Corunna, June 5, 1799, stopped six days at Teneriffe, for the ascent of the Peak, and landed, July 16th, at Cumana. There Humboldt observed, on the night of the 12–13th of November, that remarkable meteor-shower which forms the starting-point of our acquaintance with the periodicity of the phenomenon; thence he proceeded with Bonpland to Caracas; and in February, 1800, he left the coast for the purpose of exploring the course of the Orinoco. This trip, which lasted four months, and covered 1,725 miles of wild and uninhabited country, had the important result of establishing the existence of a communication between the water-systems of the Orinoco and Amazon, and of determining the exact position of the bifurcation. On November 24th the two friends set sail for Cuba, and after a stay of some months regained the mainland at Cartagena. Ascending the swollen stream of the Magdalena, and crossing the frozen ridges of the Cordilleras, they reached Quito after a tedious and difficult journey, January 6, 1802. Their stay there was signalized by the ascent of Pichincha and Chimborazo, and terminated in an expedition to the sources of the Amazon *en route* for Lima. At Callao Humboldt observed the transit of Mercury on November 9th, and studied the fertilizing properties of guano, the introduction of which into Europe was mainly due to his writings. A tempestuous sea-voyage brought them to the shores of Mexico, and after a year's residence in that province, followed by a short visit to the United States, they set sail for Europe from the mouth of the Delaware, and landed at Bordeaux, August 3, 1804.

His discovery of the decrease in intensity of the earth's magnetic force from the poles to the equator was communicated to the Paris Institute in a memoir read by him, December 7, 1804, and its importance was attested by the speedy emergence of rival claims. His services to geology were mainly based on his attentive study of the volcanoes of the New World.

The reduction into form and publication of the encyclopædic mass of materials—scientific, political, and archæological—collected by him during his absence from Europe, was now Humboldt's most urgent desire. After a short trip to Italy with Gay-Lussac, for the purpose of investigating the law of magnetic declination, and a sojourn of two years and a half in his native city, he finally, in the spring of 1808, settled in Paris with the view of securing the scientific coöperation required for bringing his great work through the press. With the exception of Napoleon Bonaparte, he was now the most famous man in Europe. He refused the appointment of Prussian minister of public instruction in 1810. In 1814 he accompanied the allied sovereigns to London. Three years later he was summoned by the king of Prussia to attend him at the congress of Aix-la-Chapelle. Again in the autumn of 1822 he accompanied the same monarch to the congress of Verona, proceeded thence with the royal party to Rome and Naples, and returned to Paris in the spring of 1823.

The French capital he had long regarded as his true home. Thus, when at last he received from his sovereign a summons to join his court at Berlin, he obeyed indeed, but with deep and lasting regret. On May 12, 1827, he settled permanently in the Prussian capital, where his first efforts were directed toward the furtherance of the science of terrestrial magnetism. His appeal to the Russian government in 1829 led to the establishment of a line of magnetic and meteorological stations across northern Asia; while his letter to the duke of Sussex, then (April, 1836) president of the Royal Society, secured for the undertaking the wide basis of the British dominions. Thus that scientific conspiracy of nations which is one of the noblest fruits of modern civilization was by his exertions first successfully organized.

In 1811, and again in 1818, projects of Asiatic exploration were proposed to Humboldt, first by the Russian, and afterward by the Prussian government; but on each occasion untoward circumstances interposed, and it was not until he had entered upon his sixtieth year that he resumed his early *rôle* of a traveler in the interests of science. Between May and November, 1829, he, together with his chosen associates Gustav Rose and Ehrenberg, traversed the wide expanse of the Russian empire from the Neva to the Yenesei, accomplishing in twenty-five weeks a distance of 9,614 miles. The journey, however, though carried out with all the advantages afforded by the immediate patronage of the Russian government, was too rapid to be profitable. Its most important fruits were the correction of the prevalent exaggerated estimate of the height of the Central-Asian plateau, and the discovery of diamonds in the gold-washings of the Ural—a result which Humboldt's Brazilian experiences enabled him to predict, and by predicting to secure.

Between 1830 and 1848 Humboldt was frequently employed in diplomatic missions to the court of Louis Philippe, with whom he always maintained the most cordial personal relations. The death of his brother, Wilhelm von Humboldt, who expired in his arms, April 8, 1835, saddened the later years of his life. In losing him, Alexander lamented that he had "lost half himself." The accession of the crown prince as Frederick William IV., on the death of his father, in June, 1840, added to rather than detracted from his court favor. Indeed, the new king's craving for his society became at times so importunate as to leave him only some hours snatched from sleep for the prosecution of his literary labors.

It is not often that a man postpones to his seventy-sixth year, and then successfully executes, the crowning task of his life. Yet this was Humboldt's case. The first two volumes of the *Kosmos* were published, and in the main composed, between the years 1845 and 1847.

The last decade of his long life — his "improbable" years, as he was accustomed to call them — was devoted to the continuation of this work, of which the third and fourth volumes were published in 1850–58, and a fragment of a fifth appeared posthumously in 1862.

On February 24, 1857, Humboldt was attacked with a slight apoplectic stroke, which, however, passed away without leaving any perceptible trace. It was not until the winter of 1858–59 that his strength began to decline, and on the ensuing 6th of May he tranquilly expired, wanting but six months of completing his ninetieth year. The honors which had been showered on him during life followed him after death. His remains, previously to being interred in the family resting-place at Tegel, were conveyed in state through the streets of Berlin, and received by the prince-regent with uncovered head at the door of the cathedral. The first centenary of his birth was celebrated September 14, 1869, with equal enthusiasm in the New as in the Old World; and the numerous monuments erected in his honor, and newly-explored regions called by his name, bear witness to the universal diffusion of his fame and popularity.

HUMBOLDT, KARL WILHELM VON, the elder brother of the more celebrated Alexander von Humboldt, was born at Potsdam, on June 22, 1767. After being educated at Berlin, Göttingen, and Jena, in the last of which places he formed a close and lifelong friendship with Schiller, he married Fräulein von Dacherode, a lady of birth and fortune, and in 1802 was appointed by the Prussian Government first resident and then minister plenipotentiary at Rome. While there he published a poem entitled *Rom*, which was reprinted in 1824. This was not, however, the first of his literary productions; his critical essay on Goethe's *Hermann and Dorothea*, published in 1800, had already placed him in the first rank of authorities on æsthetics, and, together with his family connections, had much to do with his appointment at Rome; while in the years 1795 and 1797 he had brought out translations of several of the odes of Pindar, which were held in high esteem.

In order to gain a practical knowledge of the language and complete his investigations of it, he visited the Basque country itself, the result of his visit being the valuable "*Researches into the Early Inhabitants of Spain by the help of the Basque Language*," published in 1821. In this work he endeavored to show, by an examination of geographical names, that a race or races speaking dialects allied to modern Basque, once extended through the whole of Spain, the southern coast of France, and the Balearic Islands, and suggested that these people, whom he identified with the Iberians of classical writers, had come from northern Africa, where the name of Berber still perhaps perpetuates their old designation. Another work on what has sometimes been termed the metaphysics of language appeared from his pen in 1828, under the title of *Ueber den Dualis;* but the great work of his life, on the ancient Kawi language of Java, was, unfortunately, interrupted by his death, on April 8, 1835.

HUME, DAVID, the most subtle metaphysician and one of the greatest historians and political economists of Great Britain, was born at Edinburgh, on April 26 (O.S.), 1711. David was the youngest of a family of three, two sons and a daughter, who after the early death of the father were brought up with great care and devotion by their mother.

Of Hume's early education little is known beyond what he has himself stated in his *Life*. He appears to have entered the Greek classes of the university of Edinburgh in 1723, and, he tells us, "passed through the ordinary course of education with success." At an unusually early age he had determined for himself his future course, and no inducement was strong enough to make him swerve from it. His temperament, on the whole placid and even phlegmatic, readily inclined him to seek as his mode of life the golden mean, equally removed from such external influences as could distract or disturb contemplative repose. He practiced what he taught and learned of the Stoic rules, and was concerned only to obtain such external fortune as would place him above the necessity of wasting his powers on temporary and transient objects. His prudence was as remarkable as his moderation; and his life, on the whole, may be regarded as one of the most perfect and successful instances of constant devotion to literary aims.

We see Hume, then, in the years during which the influences that mold a man's character and career are most actively at work, resolutely devoting himself to a life of literature, possessed by the most intense ambition for literary fame, and busying himself with reflection upon those problems of "philosophy and critics" in which, as he found, "nothing was yet established." His means were slender, and it was necessary for him, even in view of his primary object, to endeavor after independence. The first choice of a profession, that of law, made for him by his relatives, who thought it suited to his "studious habits, sobriety, and industry," proved unsuccessful. The intensity of his studies, the agitation due to the novelty of the ideas which began to crowd upon him as he tried to carry out systematically the first principles of human knowledge which he learned from Locke and Berkeley, combined to throw him for a time into a state of physical exhaustion and lassitude. His health was gradually restored by more careful regimen; but, as we learn from the curious diagnosis he made of his own state, the vigor requisite for protracted and connected speculation seemed to have vanished. The effectual remedy which commended itself to him was the trial of a mercantile life, and early in 1734 he set out for Bristol, armed with recommendations to some eminent merchants. A residence of a few months was sufficient to convince him that in this attempt at least he had not hit the mark. He visited Paris, resided for a time at Rheims, and then settled at La Flèche, famous in the history of philosophy as the school of Descartes. His health seems to have been perfectly restored, and during the three years of his stay in France his speculations were worked into systematic form in the *Treatise of Human Nature.* In the autumn of 1737 he was in London negotiating with publishers and printers regarding the appearance of his great work, and carefully pruning and polishing it in preparation for the judgments of the learned. In January, 1739, there appeared the first and second volumes of the *Treatise of Human Nature, being an Attempt to Introduce the Experimental Method of Reasoning into Moral Subjects*, containing book i., *Of the Understanding*, and book ii., *Of the Passions.* The third volume, containing book iii., *Of Morals*, was published in the following year.

After the publication of the *Treatise* Hume retired to his brother's house at Ninewells and carried on his studies, mainly in the direction of politics and political economy, adding to this, however, a wide if not exact reading in classical literature. In 1741 he published the first volume of his *Essays*, which had a considerable and immediate success. A second edition was called for in the following year, in which also a second volume was published.

The success of the *Essays*, though hardly great enough to satisfy the author's somewhat exorbitant cravings, was a great encouragement to Hume. He began to hope that his earlier and heavier work, if recast and lightened, might share the fortunes of its successor; and at intervals throughout the next four years he occupied himself in reducing its fundamental principles into a more succinct form, and in giving to them all the literary grace at his command. Meantime he continued to look about for some post which might secure him the modest independence he desired.

In 1746 Hume accepted the office of secretary to General St. Clair, and was a spectator of the ill-fated expedition to France in the autumn of that year. His admirable account of the transaction has been printed by Mr. Burton. After a brief sojourn at Ninewells, doubtless occupied in preparing for publication his *Philosophical Essays* (afterward entitled *An Inquiry Concerning Human Understanding*), Hume was again associated with General St. Clair, and in 1748 accompanied him as secretary in the embassy to Vienna and Turin. The notes of this journey are written in a light and amusing style, showing Hume's usual keenness of sight in some directions and his almost equal blindness in others. During his absence from England, early in the year 1748, the *Philosophical Essays* were published; but, to his great disappointment, the first reception of the work was little more favorable than that accorded to the unfortunate *Treatise.*

In 1749 Hume returned to England, enriched with "near a thousand pounds." Two years he spent at Ninewells, and then in 1751 removed to Edinburgh, where for the most part he resided during the next twelve years of his life. These years are the richest so far as literary production is concerned. In 1751 he published his *Political Discourses*, which had a great and well-deserved success. In the same year appeared the recast of the third book of the *Treatise*, called *Inquiry Concerning the Principles of Morals*, of which he says that "of all his writings, philosophical, literary, or historical, it is incomparably the best." At this time also we hear of the *Dialogues Concerning Natural Religion*, a work which Hume was prevailed on not to publish, but which he touched and retouched with the greatest care, and evidently regarded with the greatest favor. The work itself, left by Hume with instructions that it should be published, did not appear till 1779.

In 1751 Hume was again unsuccessful in the attempt to gain a professor's chair. A candidate unknown to fame then or afterward was appointed to the chair of logic at Glasgow. In the following year he received the first public preferment that had ever fallen to his lot, the librarianship of the Advocates' Library in Edinburgh, small in emoluments, but rich in opportunity for literary work.

The only work published at this time which requires somewhat special notice is the set of essays called *Political Discourses.*

In 1753 Hume was fairly settled in Edinburgh, enjoying the dignity and delights of householding, and prepared for his new attempt in literature, the *History of England.* He had decided to begin the *History*, not with Henry VII., as Adam Smith recommended, but with James I. Within a very few years the sale of the *History* was sufficient to gain for the author a larger revenue than had ever before been known in his country to flow from literature, and to place him in comparative affluence. It is from the publication of the *History* that we date the extraordinary virulence of his hatred toward everything English, toward society in London, Whig principles, Whig ministers, and the public generally. The second volume, published in 1756, carrying on the narrative to the Revolution, was better received than the first. The early portion of his *History* may be regarded as now of little or no value. The sources at Hume's command were few, and he did not even use them all. None the less, the *History* has a distinct place in the literature of England. It was the first attempt at a really comprehensive and thoughtful treatment of historic facts, the first to introduce the social and literary aspects of a nation's life as of importance only second to its political fortunes, and the first historical writing in an animated yet refined and polished style. It has received from later writers its due meed of praise and blame.

While the *History* was in process of publication, Hume did not entirely neglect his other lines of activity. In 1757 appeared *Four Dissertations: The Natural History of Religion*, *Of the Passions*, *Of Tragedy*, *Of the Standard of Taste.* Of these the dissertation on the passions is a very subtle piece of psychology, containing the essence of the second book of the *Treatise.* It is remarkable that Hume does not appear to have been acquainted with Spinoza's analysis of the affections. The last two essays are contributions of no great importance to æsthetics, a department of philosophy in which Hume was not strong. The *Natural History of Religion* is a powerful contribution to the deistic controversy; but, as in the case of Hume's earlier works, its significance was at the time overlooked. It is an attempt to carry the war directly into a province hitherto allowed to remain at peace, the theory of the general development of religious ideas. Deists, though raising doubts regarding the historic narratives of the Christian faith, had never disputed the general fact that belief in one God was natural and primitive. Hume endeavors to show that polytheism was the earliest as well as the most natural form of religious belief, and that theism or deism is the product of reflection upon experience, thus reducing the validity of the historical argument to that of the theoretical proofs.

In 1763 he accompanied Lord Hertford to Paris, doing the duties of secretary to the embassy, with the prospect of the appointment to that post. He was everywhere received "with the most extraordinary honors;" in fact, he was "lionized." The society of Paris was peculiarly ready to receive a great philosopher and historian, especially if he were known to be an avowed antagonist of religion. Hume basked in the sunshine of his popularity; but at the same time he made some valuable friendships, especially with D'Alembert and Turgot, the latter of whom admired sincerely and profited much by Hume's economical essays. In 1766 he left Paris and returned to Edinburgh; but in the following year (1767) he accepted the post of under-secretary to General Conway, and spent two years in London. He settled finally in Edinburgh in 1769, having now through his pension and otherwise the handsome fortune of £1,000 a year. The solitary incident of note in this period of his life is the ridiculous quarrel with Rousseau, an episode still amusing, and throwing much light upon the strange character of the great sentimentalist. Hume certainly did his utmost to secure for Rousseau a comfortable retreat in England, but his usually sound judgment seems at first to have been quite at fault with regard to his protégé. That is surely an amusing likeness which Hume discovered between Rousseau and Socrates; and it is interesting to note the conflict between his preconceived opinion and that which detached circumstances gave him occasion to form. He finds "Rousseau a very modest, mild, well-bred, gentle-spirited and warm-hearted man as I ever knew in my life," and thinks he "could live with him all his life in mutual friendship and esteem." At the same time he cannot avoid remarking that Rousseau "is a great humorist" (*i.e.*, full of caprices); that though "he intends seriously to draw his own picture in its true colors * * * nobody knows himself less;" that he would be unhappy in solitude, "as he has, indeed, been always in all situations." The quarrel which all the acquaintances of the two philosophers had predicted soon came, and no language had expressions strong enough for Rousseau's hatred and distrust of his protector. Hume, it must be admitted, came well out of the business, and had the sagacity to conclude that, after all, his admired friend was little better than a madman.

In 1769 Hume settled in Edinburgh, and in one of his most delightful letters he gives an animated description of the domestic economy of his later years. The house alluded to as that to which he was about to remove was built under his own directions at the corner of what is now called St. David street; and we may picture it to ourselves as being, during the closing period of Hume's life, the center of the most lively and cultivated society of Edinburgh. The gay and cheerful temper of the philosopher, his unfailing equanimity, and the solid goodness of his heart had made him many friends, even among those who dissented most from his religious views. The resolute strength with which he pushed speculation to its limits was combined with a perfect gentleness of disposition and an amiability that endeared him to all who had the pleasure of knowing him. He was singularly free from jealousy, and no feature of his character is more attractive than the unfailing cordiality with which he welcomed the literary successes of those who might have been thought his rivals. To Robertson and Smith, his personal friends, he is open and unrestrained in his praise and commendation; and his good services were ever exerted in their cause. To opponents, of whose merits he was convinced, to Campbell and Reid, he was cordial and generous. His respect for his own profession led him always to encourage those who had engaged their fortunes in the perilous hazard of literary success, and to extend to them his good offices. For Blackwell and for Smollett, in their misfortunes, he exerted himself to the utmost. Nor was he without his recompense. During the closing decade of his life he was the acknowledged patriarch of literature; the veneration and respect of his friends, for his character no less than for his abilities, were unbounded. The "gayety of his temper," says Adam Smith, "so agreeable in society, and which is so often accompanied with frivolous and superficial qualities, was in him certainly attended with the most severe application, the most extensive learning, the greatest depth of thought, and a capacity in every respect the most comprehensive. Upon the whole, I have always considered him, both in his lifetime and since his death, as approaching as nearly to the idea of a perfectly wise and virtuous man as perhaps the nature of human frailty will permit."

In the spring of 1775 Hume was struck with a tedious and harassing though not painful illness. A visit to Bath seemed at first to have produced good effects, but on the return journey northward more alarming symptoms developed themselves, his strength rapidly sank, and, little more than a month after he reached Edinburgh, he died (August 25, 1776).

HUME, JOSEPH, an eminent political reformer, was born in January, 1777, at Montrose, Scotland. He died February 20, 1855.

HUMERUS, LARS JOHANSSON, Swedish poet, more commonly known as Lucidor the Unfortunate, was born in Stockholm about the year 1642. He was murdered on the night of August 13, 1674, in a cellar at Stockholm, by a drunken soldier, Lieutenant Arvid Storm, with whom he was quarreling.

HUMILIATI, a religious order founded at Milan early in the twelfth century, by certain noblemen of Lombardy, who, having been carried captive into Germany, had regained their freedom by their "humility," did not, according to Helyot in his *Orders Monastiques*, take the monastic vows till 1134, when they were induced to do so by St. Bernard. In 1164 their ranks were recruited by other Milanese noblemen who had been similarly carried into Germany by Frederick Barbarossa. About 1151 the order was brought under the rule of St. Benedict, and in 1200 it was approved by Innocent III. Confirmed and privileged by succeeding popes, the Humiliati began to be corrupted by their popularity and prosperity, until, after a futile attempt to reform the order, Pius V. finally suppressed it in 1571.

HUMMEL, JOHANN NEPOMUK, a celebrated composer and pianist, was born November 14, 1778, at Pressburg, in Hungary. He died in 1837 at Weimar, where for a long time he had been the musical conductor of the court theater.

HUMMING-BIRD, a name in use for more than two centuries, and possibly ever since English explorers first knew of the beautiful little animals to which, from the sound occasionally made by the rapid vibrations of their wings, it is applied. Barrere, in 1745, conceiving that Humming-birds were allied to the wren, the *Trochilus*, in part, of Pliny, applied that name in a generic sense. Taking the hint thus afforded, Linnæus very soon after went further, and, excluding the wrens, founded his genus *Trochilus* for the reception of such Humming-birds as were known to him. The unfortunate act of the great nomenclator cannot be set aside; and, since his time, ornithologists with but few exceptions have followed his example, so that nowadays Humming-birds are universally recognized as forming the family *Trochilidæ*.

The relations of the *Trochilidæ* to other birds were for a long while very imperfectly understood. Nitzsch first drew attention to their agreement in many essential characters with the swifts, *Cypselidæ*, and placed the two families in one group, which he called *Macrochires*, from the great length of their manual bones, or those forming the extremity of the wing. The name was perhaps not very happily chosen, for it is not the distal portion that is so much out of ordinary proportion to the size of the bird, but the proximal and median portions, that in both families are curiously dwarfed. Still the *manus*, in comparison with the other parts of the wing, is so long that the term *Macrochires* is not wholly inaccurate. The affinity of the *Trochilidæ* and *Cypselidæ*, once pointed out, became obvious to every careful and unprejudiced investigator, and there are probably few systematists now living who refuse to admit its validity. More than this, it is confirmed by an examination of other osteological characters. The "lines," as a boatbuilder would say, upon which the skeleton of each form is constructed are precisely similar, only that whereas the bill is very short and the head wide in the swifts, in the Humming-birds the head is narrow and the bill long — the latter developed to an extraordinary degree in some of the *Trochilidæ*, rendering them the longest-billed birds known. Professor Huxley considers these two families, together with the Goatsuckers, to form the division *Cypselomorphæ* — one of the two into which he has separated his larger group *Ægithognathæ*. However, the most noticeable portion of the Humming-bird's skeleton is the *sternum*, which in proportion to the size of the bird is enormously developed both longitudinally and vertically, its deep keel and posterior protraction affording abundant space for the powerful muscles which drive the wings in their rapid vibrations as the little creature poises itself over the flowers where it finds its food.

Humming-birds, as is well known, comprehend the smallest members of the class *Aves*. The largest among them measures no more than eight inches and a half, and the least two inches and three-eighths in length, for it is now admitted generally that Sloane must have been in error when he described the "Least Humming-bird of Jamaica" as "about one and one-quarter inches long from the end of the bill to that of the tail" — unless, indeed, he meant the proximal end of each, an interpretation, however, that will not save Edwards and Latham from the charge of careless misstatement, when they declare that they have received such a bird from that island.

HUNDRED, in England, is an ancient territorial division intermediate between the parish or township and the county. Such subordinate districts were also known in different parts of the country as *wapentakes*, *wards*, and sometimes *shires*. The name *wapentake*, which seems to have a distinct reference to the military side of the organization, is generally connected with the Danish occupation and is said to be found only in the Anglian districts.

HUNGARY, the second factor of the dual Austrian-Hungarian monarchy, is an extensive country in the southeastern portion of Central Europe. It thus covers about 5° of latitude and 12° of longitude, and contains an area of 125,039 square miles, or more than half of the whole Austrian-Hungarian realm.

The kingdom of Hungary in its widest extent, or the "Realm of the Crown of St. Stephen," comprises Hungary Proper, with the former grand-principality of Transylvania, the town and district of Fiume, Croatia and Slavonia, and the Military Frontier. Dalmatia, which both from its geographical position and from historical associations ought also to form part of Hungary, sends its representatives to the Austrian Reichsrath.

	Area in Eng. Miles.
Hungary Proper and Transylvania........	108,258
Fiume................................	8
Croatia and Slavonia Military Frontier	16,773
Total................................	125,039

In the article AUSTRIA the Austrian-Hungarian monarchy has already been treated of as a whole, and under the heading CROATIA AND SLAVONIA will be found further special information with reference to that province (see also FIUME). In the present article we shall therefore treat generally of the lands belonging to the Hungarian crown, and more particularly of the "mother country," or Hungary Proper and Transylvania.

The province of Hungary Proper and Transylvania, now united under one administration, and sometimes officially styled simply "Hungary," comprises an area of 108,263 English square miles. It is bounded on the north by Moravia, Silesia, and Galicia; on the east by Bukowina and Moldavia; on the south by Wallachia, Servia, and Croatia and Slavonia; and on the west by Styria, Lower Austria, and Moravia. The narrow strip of country known as the Military Frontier, which stretches as a border line between Bosnia and Servia and the south of Croatia and Slavonia, prior to 1873 extended beyond the limits of that province, through Hungary Proper to Transylvania. The whole Military Frontier thus constituted formerly a joint crown land, consisting of the present Croatian-Slavonian frontier, and the so-called Servian-Bánát frontier, now incorporated into the province of Hungary Proper and Transylvania. The political changes introduced between 1868 and 1876 will be considered below.

With the exception of the short extent of seaboard on the Adriatic belonging to the Hungarian Littorale, the Hungarian monarchy is entirely surrounded by other countries. Its natural boundaries are for the most part well defined: on the northwest and north it is separated from Moravia, Silesia, and Galicia by the Carpathian mountains; on the east and southeast the Eastern Carpathians form a natural barrier between Transylvania and Moldavia and Wallachia; on the south it is bounded by the Danube, Save and Unna, which separate it from Servia and Bosnia; on the southwest by Dalmatia and the Adriatic; and on the west, where its natural boundaries are not so clearly marked, by Carniola, Styria, and Lower Austria. From the river Lajta or Leitha, which, like the March, forms a portion of the boundary of the last-mentioned province, originate the terms Cisleithan and Transleithan, sometimes applied to the collective provinces of Austria and of Hungary respectively.

The mountains of Hungary belong to the two great European systems, the Carpathians and the Alps. The former extend in a semicircular form over the north and east of the monarchy, inclosing the whole of the left basin of the Danube from Dévény near Pozsony (Pressburg) to Orsova, while spurs of the Styrian Alps traverse the country in the west; to these latter belong also the Bakony and Vértes ranges. The mountainous lands in the southwest of the Hungarian monarchy are in elevation much inferior to those in the north and east, but their greater proximity to the sea and their frequently bare and rugged character cause them to have a considerable influence both on the climate and commercial relations of the country.

The great Carpathian and Alpine mountain systems inclose two extensive plains, the smaller of which, called the "Little Hungarian Alföld" or "Pressburg Basin," covers an area of about 6,000 square miles, and lies to the west of the Bakony and Mátra ranges, which separate it from the "Pest Basin" or "Great Hungarian Alföld." This is the largest plain in Europe, and comprises an area of about 37,000 square miles, with an average elevation of from 300 to 350 feet above the level of the sea. The Pest Basin extends over the greater portion of central and southern Hungary, and is traversed by the Theiss and its numerous tributaries. This immense tract of low land, though in some parts covered with barren wastes of sand, alternating with marshes, presents in general a very rich and productive soil.

The numerous caverns deserve a passing notice. One of them, the Aggtelek cave, in the county of Gömör, is about fifty feet in breadth by sixteen in height, and extends in its recesses for a length of several thousand feet. In it various fossil mammalian remains have been found. The Fonácza cave, in the county of Bihar, has also yielded fossils. No less remarkable are the Okno, Vodi and Deményfalva caverns in the county of Liptó, the Veterani in the Bánát, and the ice cave at Dobsina in Gömör county. Of the many interesting caverns in Transylvania the most remarkable are the sulphurous Büdös in the county of Háromszék, the Almás to the south of Udvarhely, and the brook-traversed rocky caverns of Csetate-Boli, Pestere and Ponor in the southern mountains of Hunyad county.

Nature has amply provided the greater part of Hungary with both rivers and springs, but some trachytic and limestone mountainous districts show a marked deficiency in this respect. The Mátra group, *e.g.*, is poorly supplied, while the outliers of the Vértes mountains toward the Danube are almost entirely wanting in streams, and have but few water-sources. A relative scarcity in running waters prevails in the whole region between the Danube and the Drave. The greatest proportionate deficiency, however, is observable in the arenaceous region between the Danube and Theiss, where for the most part only periodical floods occur. This, however, is far from being the case in the north and east of the kingdom, where the rivers and streams are numerous. The misfortune is that the rivers of Hungary nearly all flow either mediately or immediately to the Danube, and are therefore not available in any other direction as a means of external communication, and even within the country can only serve to a limited extent as waterways.

The Balaton or Platten-See, the largest lake, not only in Hungary, but in the whole of the Austrian-Hungarian dominions, lies between the counties of Veszprém, Somogy, and Zala, is about forty-seven miles in length by three to nine in breadth, and with the surrounding marshes occupies an area of about 400 square miles. It is supplied by the river Zala, thirty-one small streams, and nine springs, while its surplus waters are carried off by the Sió. Phenomena peculiar to the Balaton lake are, that it sometimes becomes violently agitated without any apparent cause, and that in seasons of severe cold the ice on its surface occasionally bursts with a loud report. It is navigable for steamers, and abounds in fish.

The canals of Hungary are still far from sufficient for the wants of the country, although lately many improvements have been introduced, and enormous cuttings made in certain places to relieve the rivers from periodical overflow.

On the Adriatic, at the northern extremity of the short line of seacoast known as the "Hungarian Littorale," lies the port of FIUME (*q. v.*), which is the only direct outlet by sea for the produce of Hungary.

The climate of Hungary, owing to the physical configuration of the country, varies considerably.

The whole of Hungary, but more especially Hungary Proper, can boast of the great variety and number of its natural productions. This is attributable partly to its geographical position, but chiefly to the varied nature of its surface and climate. The fertility of the soil, if we except the mountainous and sandy regions, is remarkable. The vegetable products include almost every description of grain, especially wheat and maize, besides Turkish pepper, rapeseed, hemp and flax, beans, potatoes, and root crops. Fruits of various descriptions, and more particularly melons and stone fruits, are abundant. In the southern districts almonds, figs, rice, and olives are grown. Among the forest and other trees are the oak, which yields large quantities of galls, the beech, fir, pine, ash, and alder, also the chestnut, walnut and filbert. The vine is cultivated over the greater part of Hungary. A great quantity of tobacco is also grown, but it is wholly monopolized by the crown. In Hungary Proper and in Croatia and Slavonia there are many species of indigenous plants, which are unrepresented in Transylvania. Besides twelve species peculiar to the former grand-principality, fourteen occur only there and in Siberia.

The fauna of Hungary includes about 14,000 species. The horned cattle are among the finest in Europe, and large herds of swine are reared in the oak forests. The wild animals are bears, wolves, foxes, lynxes, wildcats, badgers, otters, martens, stoats and weasels. Among the rodents there are hares, marmots, beavers, squirrels, rats, and mice — the last in enormous swarms. Of the larger game the chamois and deer are specially noticeable. Among the birds are the vulture, eagle, falcon, buzzard, kite, lark, nightingale, heron, stork, and bustard. Domestic and wild fowl are generally abundant. The rivers and lakes yield enormous quantities of fish, and leeches are also plentiful. The Theiss, once better supplied with fish than any other river in Europe, has for many years fallen off in its productiveness. The culture of the silkworm is chiefly carried on in the south — in the Military Frontier, and in Croatia and Slavonia. The principal bee-bearing localities are in the counties of Gömör, Szepes, and Mosony, the Military Frontier, and the former Saxon districts of Transylvania.

The chief mineral products are coal, niter, sulphur, alum, soda, saltpeter, gypsum, porcelain-earth, pipe-clay, asphalt, petroleum, marble, and ores of gold, silver, mercury, copper, iron, lead, zinc, antimony, cobalt, and arsenic. The opals of Sáros are famous, and precious stones of various descriptions (chalcedony, garnet, jacinth, amethyst, carnelian, agate, rock-crystals, etc.) are met with in several localities. Amber occurs at Magura in Szepes county. The sand of some of the rivers, as for instance the Maros, Szamos, Körös, and Aranyos, is auriferous. Iron and coal are extensively produced. There are fine marble quarries. The largest salt-mines are at Rónaszék, Sugatag, and Szalatina in the county Máramaros, in Hungary Proper, and at Vizakna, Parajd, Torda, Deésakna, and Marosujvár in Transylvania. There are several hundred cold and sixty-four warm mineral springs in Hungary Proper and in Croatia and Slavonia, while a relatively greater number are met with in Transylvania.

Since the year 1867 the administrative and political divisions of the lands belonging to the Hungarian crown have been in great measure remodeled. In 1868 Transylvania was definitely reunited to Hungary Proper, and the town and district of Fiume declared autonomous. In 1873 the Servian-Bánát or Eastern Military Frontier was incorporated with Hungary Proper. In 1876 the whole administrative subdivision of Hungary into counties, districts, and sees was revised, and for the sake of uniformity one general system of counties was introduced, except for the Croatian-Slavonian Military Frontier, which is divided into border districts. The total number of subdivisions amounts to eighty, of which sixty-five appertain to Hungary Proper and Transylvania, one to Fiume and district, eight to Croatia and Slavonia, and six to the Croatian-Slavonian

Military Frontier. Hungary Proper, according to ancient usage, is generally divided into four great divisions or circles, and Transylvania has since 1876 been regarded as the fifth. Neither numerically nor according to territorial extent are the present sixty-five counties distributed equally among their respective circles, which must be regarded as geographical rather than political divisions, for they are not recognized in the judicial, fiscal, military, postal and administrative relations of the country.

The population of Hungary comprises a great variety of races, differing in language and religion, although united under one common sovereignty. At the census of 1901 the whole population, civil and military, amounted to 19,207,103.

Since the year 1867 great improvements have been effected in the educational system of Hungary, especially in Hungary Proper and Transylvania. Before that year public instruction was in the hands of the ecclesiastics of the various confessions, and the public schools had in consequence more or less of a denominational character. One of the first cares of the new responsible ministry of 1867 was to provide for the education of all children not attending the then existing scholastic establishments, by the introduction of supplementary non-denominational schools. By a law passed in 1868, the government made it compulsory on children of both sexes between the ages of six and twelve to attend school, and it moreover required that children from twelve to fifteen should attend the "repetition schools." The educational system of Croatia and Slavonia is autonomous, being under the independent direction of the Croatian-Slavonian provincial government.

The various educational establishments may be divided into four classes: common, middle, high, and special schools.

The form of government in Hungary is that of a constitutional monarchy. The sovereign power is at present vested in the house of Hapsburg-Lorraine, whose descendants succeed by right of primogeniture in the male line. By virtue of the Pragmatic Sanction, females may also reign in the event of there being no male successor. The king is the guardian of the laws, and the head of the army and of the executive. His power is limited by parliament, which consists of an upper and lower house, and must be summoned yearly and elected triennially. The upper house comprises four hundred and seven members, viz., three princes of the reigning house, thirty-one Roman and Greek Catholic prelates, eleven standard-bearers, fifty-seven lord-lieutenants of counties, three dukes, two hundred and nineteen counts, eighty-one barons, and two deputies for Croatia and Slavonia. The lower house, elected by the eligible taxpayers, consists of four hundred and forty-six members, of whom four hundred and three represent Hungary Proper and Transylvania (including also Fiume), and forty-three Croatia and Slavonia and the Military Frontier. The language used in the house is the Magyar, but the representatives of Croatia and Slavonia may use their native language. The executive is vested in a president of the cabinet and the following ministers: court; finance; interior; religion and education; justice; public works; agriculture, industry, and commerce; *honvéd* (home-defense); and a ministry for Croatia and Slavonia. For matters relating to its special provincial administration, Croatia and Slavonia has at Zágráb (Agram) its own government, at the head of which is the ban, who is nominated by the king. The departments are three — interior and finance, religion and education, and justice.

The judicial power is independent of the administrative, the functions of the minister of justice being to see that the laws are properly applied. The supreme courts of justice, as also those of second instance for Hungary Proper and Transylvania and Fiume, are at Budapest. There is also a secondary court of appeal at Maros-Vásárhely in Transylvania.

The southwestern portion of Hungary, as formed by the Danube, belonged to the Roman Province of Pannonia; the southeastern portion, as formed by the Theiss (Ptol. iii. 8, § 4), to that of Dacia; the tract of country lying between these two rivers was inhabited by the Jazyges. As early as 274 A.D. Dacia was abandoned by the Romans to the Goths. In 376 the Huns crossed the Don, and, having overrun the intervening country, about 380 established themselves in Pannonia, where under Attila their power was so vastly extended that in 432 the authority of the Romans entirely ceased. After the death of Attila (453) the greater part of the country fell into the hands of the Ostrogoths and Gepidæ. These yielded in their turn to the Longobardi, who in 526–548 gained possession of the whole of Pannonia. When the latter removed to Italy in 568, the Avars entered, but they were reduced to subjection by Charlemange in 791–796.

The history of Hungary really begins with the appearance of the Magyars in Europe about the year 884. It is generally admitted that they were a branch of the Turanian stock, and descendants of the ancient Scythians; certain affinities of language show them to be related to the Lapps, Esths, and Finns. They are believed to have wandered from the Ural mountains to the region of the middle Volga, and thence to have migrated westward over the Dnieper and the Bug. At the time of their crossing the Carpathians about 889, under the lead of Álmos, they were divided into seven tribes, united by a compact which guaranteed justice and equality among their members. At the death of Álmos, in 889, the chiefs of the tribes elected his son Arpád successor. His followers overran the whole of Hungary and Transylvania, extending their conquests beyond the ancient province of Pannonia. From the time of the conquest to the year 1000, Hungary was ruled by dukes, the regal title being first assumed by Vaik (Stephen).

Under Zoltán and Taksony the Hungarians made various expeditions beyond the limits of their own country, spreading terror and devastation through Europe. They were ultimately checked, however, by the emperor Henry I., near Merseburg, in 933, and afterward by Otho the Great at the Lech (955). These defeats caused the Hungarians to turn their attention to the consolidation of their power within their own territory. Geyza, who succeeded Taksony in 972, married a Christian princess, and also furthered the introduction of Christianity by intrusting the education of his son Vaik to Adalbert, bishop of Prague. On succeeding his father, Vaik applied for and received the title of "apostolic king" from the hands of Pope Sylvester II., and was crowned in the year 1000 under the the name of Stephen. This monarch, known as "St. Stephen of Hungary," laid the foundation of many existing institutions. He subdivided the land into counties, and provided it with an ecclesiastical organization, establishing bishoprics, and founding churches, chapels, convents, and schools. Having elevated the bishops to the highest posts of trust and power in the state, he forced the people to pay tithes to the clergy. He also created a national council, consisting of the lords temporal and spiritual, and of the knights or lower nobility, from which assembly the subsequent diets originated. Stephen dying 1038, and leaving no heir, the queen, Gisela, contrived to gain the throne for her nephew Peter, but a portion of the nobles declared for

Aba, who was of Arpadian blood. In the wars which ensued both princes perished, when Andrew I., who was nearly related to Stephen I., succeeded to the throne in 1047, but he was ultimately forced to yield it to his brother, Béla I. The next monarch's reign that offers anything worthy of notice is that of Ladislaus I., whose religious zeal gained him the appellation of "Saint," and who was distinguished on account of his conquest of Croatia (1089) and part of Galicia (1093), and for his victories over the Cumans (1086–89), the invaders of Transylvania and the neighboring districts. His nephew Coloman, a brave and talented monarch, guarded the country against the depredations of the hosts of crusaders who passed through it during his reign. He also wrested Dalmatia from the Venetians (1102), and annexed it to the Hungarian kingdom. Coloman died in 1114, leaving the throne to his youthful son, Stephen II., who soon entangled himself in warfare with the neighboring princes. The reign of his successor, Béla II. (1131–41), like that of the other kings of the twelfth century, presents few features of interest. That of Andrew II. (1205–35) is celebrated on account of the "Golden Bull" or Hungarian Magna Charta, extorted from the king by the nobles in the year 1222, after his return from a crusade forced upon him by the pope. The Golden Bull guaranteed that the states should be convoked annually, that no noble was to be arrested without being first tried and legally condemned, that the property of the nobility should be exempt from dues, that foreign service was to be rewarded, that appointments to the highest offices should be under the control of the diet. It also contained numerous other clauses granting certain freedoms, privileges, and exemptions to the nobility and clergy, and included a proviso of the right of armed resistance to tyrannical measures on the part of the crown. This charter was duly sworn to by subsequent kings of Hungary, but the article relating to the right of appeal to arms was abrogated in 1687. A few years after the accession of Béla IV., son of Andrew II., the Tartars invaded and devastated the whole country, massacring great numbers of the population (1241–42). Béla did all in his power, by the introduction of German colonists, to retrieve the disasters inflicted by the invasion ; but his wars with Austria and Styria, and the revolts of his son Stephen, were prejudicial to the restoration of order. He, however, successfully repelled a second Tartar invasion in 1261. The reigns of the next two monarchs, Stephen V. (1270–72) and Ladislaus IV. (1272–90), are noticeable chiefly for the wars on behalf of Rudolf of Austria against Ottokar of Bohemia. Ladislaus is said to have been murdered in 1290 amid violent commotions caused by his Cumanian amours. His successor, Andrew III., the last king of the Árpád dynasty, after a short but disturbed reign, died in 1301, leaving no issue.

On the death of Andrew III. the royal dignity became an object of competition. One party elected Wenceslaus, son of the king of Bohemia and Poland (1301–5), and after him Otho of Bavaria (1305–8), both connected with the Arpadian house. Pope Boniface VIII. and the bishops successfully espoused the cause of Charles Robert of Anjou, nephew of the king of Naples, and related to the extinct dynasty through his mother, a daughter of Stephen V. Under Charles and his son Louis, which latter in 1370 succeeded Casimir III. on the throne of Poland, Hungary made great progress both at home and abroad. During the reign of Louis it became the most formidable state in Europe. Among many other territories he conquered Moldavia (1352) and Bulgaria (1365); he also greatly extended and developed the royal prerogatives in his own kingdom. Upon the death of Louis (1382), the states raised to the throne his daughter Maria, who, after the assassination of the pretender Charles II. (1386), reigned conjointly with her consort Sigismond of Brandenburg, son of the emperor Charles IV. In the early part of this reign the Turks under the sultan Bajazet infested some of the Hungarian provinces, and at length in 1396 utterly defeated Sigismond at Nicopolis, obliging him to fly the kingdom. During his absence a party headed by the palatine Gara raised the standard of rebellion, and upon his return deprived him of his liberty. Scarcely was he released when he met with a rival in Uladislaus, king of Poland, who had married Hedwig, second daughter of Louis. Elected emperor (1411), and afterward king of Bohemia (1419), Sigismond, instead of providing for the safety of the country, employed his time in persecuting the Hussites. He ended his long and troublous reign December 9, 1437, and was succeeded by his son-in-law Albert, archduke of Austria.

The year 1439 witnessed the sudden death of Albert; his widow, however, was soon delivered of a son, Ladislaus Posthumus. The states invited Uladislaus of Poland to the throne, and thus considerable dissensions existed until the death of the queen in 1442, when the party of Uladislaus secured his accession. At the commencement of his reign the Turks were several times defeated by John Hunyady (Corvinus), and they were at length forced to conclude a truce for ten years. The Hungarians, having almost immediately broken faith with the Turks, and taken the field against them, were completely routed at Varna on November 10, 1444. In this battle Uladislaus met his end, while Hunyady escaped with a few followers. Amid the troubles which ensued the states proclaimed Hunyady "governor of Hungary" pending the absence of Ladislaus Posthumus, whom the emperor Frederick III. refused to deliver to the Hungarians to be acknowledged king. After the release and recognition of Ladislaus in 1452, Hunyady resigned the office of governor, and was nominated generalissimo by the king.

After the fall of Constantinople in 1453, Mohammed II. made preparations for the conquest of Hungary, and in 1456 appeared before Belgrade with an army of 150,000 men. This force was, however, utterly routed on July 21, 1456, by the combined Hungarian, Italian and Spanish troops, in all about 70,000 men, under the command of John Hunyady and the monk John Capistran. Soon after this victory, which resulted in the Turks raising the siege, Hunyady succumbed to dysentery aggravated by excessive fatigue, leaving behind him two sons, Ladislaus and Matthias. The former was executed by order of Ladislaus Posthumus, while the latter, after that monarch's death in November, 1457, being supported by a strong party under the leadership of his uncle Michael Szilágyi, was elevated to the royal dignity on January 24, 1458, under the title of Matthias I. The emperor Frederick, having disputed his right to the throne, and assumed the regal title himself, was forced by Matthias to surrender all claims to the Hungarian dominions, and to conclude a peace in July, 1463. During the next few years Matthias was employed in reorganizing the military system and repelling the Turks. He after this turned his arms against Podiebrad, king of Bohemia (1468), ostensibly for the purpose of defending the Catholics against the Hussites. Being victorious in these campaigns, Matthias, in May, 1469, caused himself to be proclaimed king of Bohemia and Moravia at Olmütz. Meanwhile the Turks, taking advantage of the absence of the king, made incursions into the southern provinces of Hungary. This misfortune created a party against Matthias, who, having returned to Hungary and restored order, marched against the Ottoman forces, and totally defeated them in a sanguinary battle on the plains of Kenyérmezö in Transylvania (November 13, 1479). After the death of Mohammed II. in 1481, Matthias renewed hostilities with the emperor Frederick, and, having taken Vienna (1485), made it the seat of his government. Matthias was not only an able and warlike monarch, but a patron of letters, and administered his kingdom with impartiality, subduing the rebellious nobles, and restoring order, law and prosperity.

At the death of Matthias, April 6, 1490, there were several pretenders to the throne, among them John Corvinus, a natural son of the late king, the emperor Frederick, and his son Maximilian. But the states disallowed their claims, and declared for Uladislaus of Bohemia, whose weak reign is marked chiefly by the insurrection of the peasantry in Transylvania, under Dózsa, which was suppressed with great bloodshed in 1514, as also for the collection made by Verböczy of the common laws of the realm, entitled "Tripartitum Opus Juris Consuetudinarii Inclyti Regni Hungariæ," which code was sanctioned by the king and the diet in 1514. Under this monarch and his son Louis II., who succeeded him, the power of Hungary rapidly declined, and it was at length utterly overthrown by the Turks under Soliman the Magnificent. This powerful ruler, having captured Belgrade and Peterwardein, advanced at the head of 200,000 men into the interior of the country, and annihilated the Hungarian army at the battle of Mohács, August 29, 1526. In the carnage several prelates and the flower of the Hungarian nobility were destroyed, and Louis himself perished in his flight. The Ottomans, after pillaging Buda and spreading devastation over the whole country, took their departure with many thousands of captives.

After the catastrophe at Mohács and death of Louis in 1526, a portion of the nobles declared for John Zápolya, waywode of Transylvania, who was accordingly crowned at Székesfehérvár (Stuhlweissenburg). Maria, the widow of Louis, immediately summoned a diet of the nobility of the western counties at Pozsony (Pressburg), who pronounced the election of Zápolya illegal, and proclaimed the queen's brother, Ferdinand of Austria, king of Hungary (December 16, 1526). In the following August Ferdinand, having proceeded to Hungary, was again proclaimed king at Buda; he was afterward crowned at Székesfehérvár, November 5, 1527. With this monarch the Hapsburg period commences, the sovereign rulers of Austria after him succeeding to the title of the Hungarian crown.

John Zápolya, being compelled to retire before the superior forces of Ferdinand, took refuge for a time in Poland, whence he sought the assistance of Soliman II. The sultan listened to his request, and, in 1529, conducted a large army into Hungary, took Buda by storm (September 3d), reinstated Zápolya, and drove the Austrians before him to Vienna. Failing to take that city, Soliman, in October, retraced his steps, and, after garrisoning Buda with Turkish troops, returned in triumph to Constantinople. After several years of desultory warfare between John and Ferdinand, their rival claims were ultimately settled by a treaty concluded at Nagyvárad (Grosswardein), February 25, 1538. By this treaty it was stipulated that John was to retain the title of king, together with Transylvania and the eastern portion of Hungary then in his possession, while Ferdinand was to hold the remainder, with the proviso that John's male descendants were to surrender all claims to the regal dignity. John having died July 21, 1540, his infant son, Sigismond, was crowned by the adherents of his father, and he was subsequently confirmed in his title to Transylvania by Soliman. This sultan, however, retained a great portion of Hungary in his own possession, and even placed a pasha as regent at Buda; he, moreover, compelled Ferdinand to pay him an annual tribute of 30,000 ducats. Ferdinand, having caused his son Maximilian to be crowned as his successor in 1563, died on July 25th of the following year. When Maximilian succeeded to the throne, he found himself obliged to continue the war with the young Zápolya, whose cause was espoused by Soliman. In 1566 the sultan, advancing at the head of a large force, was arrested at the small fortress of Sziget by Nicholas Zrinyi, who, with a garrison of 3,000 men, for four weeks heroically defied the whole power of the besiegers. Soliman himself died shortly before the final assault on the citadel, which was overpowered only after the destruction of a large part of his army. In the year 1570 Zápolya concluded peace with Maximilian, and, on his death in the following year, Stephen Báthori, with the consent of the sultan Selim, was elected prince of Transylvania. Maximilian, having, in 1573, secured the succession of his son Rudolph to the throne of Hungary, died October 12, 1576.

By this time the Reformation had made considerable progress in Hungary, more especially among the higher classes, but with Rudolph the persecution of the Protestants commenced. In Transylvania, however, they met with a protector in Stephen Báthori, from 1576 to 1586 distinguished as king of Poland. In 1604 the Protestants of Hungary, having raised the standard of freedom under Stephen Bocskay, defeated the generals of Rudolph in several engagements, and on June 23, 1606, they forced him to conclude peace at Vienna, thus securing to themselves for a time their religious liberties. In 1608 Rudolph resigned the kingdom to his brother Matthias, who, during his short reign, showed great toleration toward the adherents of the Reformed creeds. He died March 20, 1619, leaving the crown to his cousin Ferdinand II., the hero of the "Thirty Years' War." The accession of this monarch was signalized by the insurrection of the Protestants of Bohemia, and the renewal of persecutions in Hungary, fomented by the Jesuit prelate Peter Pázmán. But the victories of the Transylvanian prince Bethlen Gábor (Gabriel Bethlen) over the imperialist troops forced Ferdinand to conclude the treaty of Nikolsburg, December 31, 1621. By this compact the privileges of the Protestants were declared inviolate, and Bethlen's claim to the principality of Transylvania and seven counties of Hungary Proper was established. The infringement of this treaty on the part of Ferdinand brought about a renewal of hostilities, which resulted in a second peace, concluded at Pozsony (Pressburg) in 1626. After the death of Bethlen in 1629, the Jesuits succeeded in gaining over several powerful families to the Roman Church, and the religious persecutions were renewed by Ferdinand III., who succeeded his father in 1637. The Transylvanians had elected George Rákóczy as their prince, who proclaimed himself the protector of Protestantism and of Hungarian liberty. Having drawn up a statement of grievances — those of the Protestants in particular — he laid the document before Ferdinand, who, however, paid no attention to it. Rákóczy thereupon collected troops and gained several successes over the imperialists (1644), and in the next year formed a league with the Swedes. This coalition brought Ferdinand into desperate straits, and he therefore soon entered into a treaty of peace with Rákóczy at Linz (December 16, 1645). By this treaty, confirmed at the diet held in 1647, Rákóczy was formally recognized as the legitimate prince of Transylvania. He died the year afterward (1648), and was succeeded by his son George II. Rákóczy. The year 1657 witnessed the death of Ferdinand III., who was succeeded by his second son, Leopold I.

During the long reign of this monarch, so injurious to the cause of Hungarian liberty, Hungary was the theater of intestine wars, insurrections, and the most tragic events. Shortly after his accession, Leopold became involved in war with the Turks, who had created Michael Apaffi prince of Transylvania in the place of his own partisan John Kemény. The Turks, although at first successful, were ultimately defeated by the imperialists at St. Gotthard, August 1, 1664. This victory enabled Leopold to conclude a hasty and disadvantageous peace at Vasvár (August 10th) with the infidels, and to direct his whole energies against the Protestants. The irritation consequent upon this harsh treatment resulted in a conspiracy, which was organized by the Croatian ban Peter Zrinyi, Count Frangepan, Francis Rákóczy, and the chief justice Nádasdi, and had for its object the separation of Hungary from the house of Hapsburg. The plot having been discovered, the leaders were surprised, conveyed to Vienna, and, with the exception of Rákóczy, executed (April 30, 1671). Although an amnesty was proclaimed on June 6th, of the same year, Leopold in February, 1673, appointed a bigoted Catholic, John Caspes Ambringen, governor-general of the kingdom, and made every effort to extirpate the Protestant religion. The oppression becoming at last intolerable, the Protestants again rose in arms under Michael Teleki and Emeric Tökölyi (1678), and were subsequently supported by the grand vizier Kara Mustapha, who in 1683 marched straight to Vienna with a large force. The valor of Sobieski, king of Poland, delivered the city (September 12, 1683), and saved Austria from the threatened destruction. In 1686 Buda was taken from the Turks by Charles of Lorraine, and these troublesome foes were at length driven out of most of the provinces and towns of Hungary where they had been settled for about a century and a half. The glory of these achievements was, however, tarnished by the emperor's revengeful treatment of the Hungarians, hundreds of whom, on suspicion of complicity with the enemy, were put to death upon the scaffold erected in the market-place of Eperies by order of General Caraffa, which remained standing from March, 1687, till the end of the year. Leopold at length granted a general amnesty, but obliged the diet to declare the throne hereditary in the house of Austria, and to abrogate the clause of the Golden Bull which allowed the right of armed resistance to tyranny (October 31, 1687). The victories of Prince Eugene, which completed the conquests over the Turks, resulted in the peace of Carlowitz, January 26, 1699, by which the Porte abandoned Hungary and Transylvania to the emperor. On May 5, 1705, Leopold died, and was succeeded by his eldest son Joseph I. In the year 1703 Francis Rákóczy II. headed a new revolution, which lasted till May, 1711, when peace was concluded at Szatmár by Károly, the chief of the Hungarian generals. The emperor Joseph I. died on April 17th of the same year, and was succeeded by his brother, the archduke Charles. From this time until 1848 no open rupture occurred between Hungary and her Hapsburg rulers.

By the treaty of Passarowitz, concluded July 21, 1718, Temesvár, the last of the Turkish possessions, reverted to Hungary. In 1722 Charles received the adhesion of the diet to the Pragmatic Sanction, which secured the right of succession to the throne in the female line. At the instigation of Russia hostilities were renewed against the Turks, but Prince Eugene being now dead, and no other leader of equal ability appearing in his place, the Austrians were subjected to a series of disgraceful defeats. These misfortunes were consummated by the humiliating treaty of Belgrade (September 18, 1739), in accordance with which the emperor was forced to cede the fortress of Belgrade, with Servia and Austrian Wallachia. On October 20th of the following year Charles died, leaving the throne to his daughter Maria Theresa. Her claims to the imperial dignity were almost immediately called in question by Prussia, Saxony, France and Bavaria, and her hereditary dominions were invaded by hostile troops. Maria, in despair, fled to Pozsony (Pressburg), and summoned the Hungarian diet. Appearing before that assembly on September 11, 1741, with her infant son Joseph in her arms, she appealed in Latin to the magnanimity and loyal spirit of the nobles. The result of her address was the unanimous declaration on their part: "Moriamur pro 'rege nostro' Maria Theresa." Nor was this an empty burst of enthusiasm, for the "insurrectio," or general rise of the nation was proclaimed, and a large army collected, and Hungarian blood was profusely shed in support of her cause. Maria repaid the devotion of her subjects by the zeal which she showed for their welfare, and the salutary changes which she effected in the country. Transylvania was raised into a grand-principality (1765), and the town and district of Fiume declared a *corpus separatum* of the Hungarian crown (April 23, 1779). Maria Theresa also created an Hungarian guard, established several schools, and enlarged the university at Nagyszombat (Tyrnau), which, in 1777, was transferred to Buda, and seven years later to Pest. But her efforts to ameliorate the condition of the peasantry, and the reforms which she introduced under the name of the *Ubarium* (1765), which determined the rights of the tenant serfs in relation to the landowners, are among the chief merits of her reign. She died November 29, 1780, and was succeeded by her son, Joseph II.

This philosophic monarch was wholly carried away by his zeal for reforms, which were both subversive of the constitution and opposed to the will of the nation. He refused to be crowned in Hungary, and thus avoided the obligations of the usual coronation oath. In defiance of ancient custom, he carried the crown of St. Stephen to Vienna, dispensed altogether with the use of diets, and governed the country autocratically by decrees. He issued a general edict of toleration in religious matters (October, 1781), but forced upon the people heavy taxes and foreign officials; he, moreover, enjoined the exclusive use of the German language in the schools, courts of justice, and public administration. The general discontent at these measures was heightened by the unfavorable issue of the war against Turkey; and Joseph, shortly before his death (1790), found himself compelled to revoke nearly all his edicts, and promise redress to his irritated subjects. His brother and successor, Leopold II., appeased the Hungarians by more definitely confirming the rights and liberties of the nation than any of his predecessors. After a reign of only two years, Leopold died, and was succeeded by his eldest son, Francis I. (1792). This monarch duly swore to maintain the laws and constitution of Hungary, but his efforts were eventually directed wholly against them. During the continuance of his war with France, he repeatedly convoked the states, only, however, for the purpose of obtaining supplies of men and money to carry on the struggle. Through the whole of this crisis the Hungarians faithfully supported the Austrian cause, and disdainfully rejected the offers of Napoleon in his proclamation of May 15, 1809, calling upon them to rise for national independence. But at the end of the great war the Hungarian nation received little gratitude for its devotion. Francis for several years discontinued the holding of the diet, and acted in direct violation of the constitution by levying troops and increasing the taxation to more than double. The opposition which these arbitrary measures provoked in the counties at length obliged him, in 1825, to convene the states, and thus appease the widespread dissatisfaction.

To the holding of this diet, in which Count Stephen Széchenyi initiated the use of the Magyar instead of the accustomed Latin tongue, may be traced not only a reaction in favor of the native language, but also the commencement of the reform movement. The spirit of nationality was fully aroused, and liberal sentiments were diffused over the whole kingdom, notwithstanding the active opposition of the Viennese court influenced by Metternich, in the reigns of both Francis and his successor Ferdinand (1835). The diets of 1832, 1839, and 1843 passed several measures of reform, among which the most important were those demanding the official use of the Magyar language, the equality of the various Christian confessions and the rights of the peasantry and of the non-ennobled citizens. Among the leaders of the liberal party the magnates were Count Louis Batthyányi and Barons Nicholas Wesselényi and Joseph Eötvös, and the deputies Deák, Klauzál, Fáy, Beöthy, Balogh, Szemere, and Louis Kossuth. In the hope of intimidating the advanced liberals, the Viennese court in 1839 imprisoned Wesselényi and Kossuth, but they were released in 1840 owing to the amnesty then proclaimed for political offenders. The publication of the *Pesti Hirlap* (Pest Gazette) was commenced in 1841 by Kossuth as the organ of the liberal party. This paper, the leading articles of which were written in a spirit directly opposed to the policy of the government, gained an immense circulation, and considerably influenced the public mind. A pamphlet styled *A Kelet Népe* (The People of the East), written by Széchenyi in order to counteract the schemes of Kossuth, only served to add to the importance of the *Pesti Hirlap*. The conservative journal *Világ* (Light) was conducted by Count Aurél Dessewffy, who from 1833 until his death in 1842 was the leader of the conservative party.

Meanwhile intellectual and material improvement made rapid progress, especially in the Hungarian capital. Numerous works, literary and political, were published, the former due to the encouragement offered by the Hungarian academy and the Kisfaludy society, but the latter the outcome of great political excitement prevailing throughout the country. Clubs really if not avowedly political were established in most of the principal towns. Steam navigation of the Danube, the Budapest suspension bridge (commenced May, 1840), and other improvements of the means of internal communication, which had received their first impulse from Count Széchenyi, were rapidly proceeded with. In order to encourage native trade and industry, long obstructed by toll and custom duties, Kossuth called into existence the *Védegylet* (Protection Union), the members of which pledged themselves to abstain from the use of Austrian manufactures until the tariff should be reformed. This association soon overspread the country, and affected Austrian trade so seriously that some manufacturers had to transport their factories into Hungary in order to save themselves from ruin. The establishment of this association, the liberal measures of the late diets, and the unanimity of national feeling in Hungary Proper and Transylvania embarrassed the government of Vienna, which could reckon only on the support of the Conservatives, whose numbers and moral influence were comparatively small. Metternich therefore determined to annihilate the municipal independence of the counties, in whose assemblies lay the real strength of the Liberals, by the appointment of "administrators" paid by the court to fill the places of all absent lord-lieutenants. This measure raised the political excitement of the nation to the highest pitch. The Liberals were soon divided into two parties, the so-called "municipalists," with Kossuth at their head, who urged the reaffirmation of the county institutions, and the "centralists," led by Szalay and Eötvös, who insisted upon the nomination of a responsible ministry. On the approach of the elections for the diet of 1847 these two parties agreed upon a common course of action. In November the diet was summoned, when Kossuth appeared as a candidate for the county of Pest, and after a warm contest was elected. On November 12th the diet was opened at Pozsony (Pressburg) by Ferdinand V. in person, who by addressing the assembled states in the Magyar language instead of Latin produced a very favorable impression. The first act of the diet was the unanimous election of a successor to the late palatine Joseph in the person of his son the archduke Stephen. Thus far all was well, but the address to the throne containing clauses inserted by Kossuth's party, deprecatory of unconstitutional measures by the government, after passing the lower was rejected by the upper house, by which means the royal speech was practically ignored. At the commencement of the year 1848 an act was carried through both houses, ordaining the exclusive use of the Magyar language in all branches of the administration, in legal documents, and in the schools and colleges. Certain provisions were, however, made respecting Croatia and Slavonia.

Upon the news of the French revolution the diet was powerfully impressed, and the Liberals assumed a more determined attitude. On the proposal of Kossuth it was unanimously resolved to send a deputation to Vienna demanding from the government a responsible ministry, the abolition of all feudal burdens, the equalization of taxes, the extension of the franchise, freedom of the press, complete religious toleration, and several other measures of reform. On March 16th, the address was presented to Ferdinand, who, by reason of the troubled state of his Italian provinces and the revolutionary aspect of Vienna, was compelled to yield his assent. The palatine archduke Stephen was nominated viceroy in Hungary, and Count Louis Batthyányi intrusted with the formation of a ministry. The irritation of the Viennese Government at this enforced compliance with the Hungarian demands was increased by the choice of Kossuth as minister of finance. On April 11th Ferdinand repaired to Pozsony (Pressburg), and the diet was closed with a Magyar speech from the throne.

But the Austrian Government, although compelled to abandon for the present its position of open and direct hostility to the national will of the Hungarians, was determined by other means to prevent the new reforms from being carried out. The plan adopted was that of secretly encouraging the southern non-Magyar nationalities to assert their independence, and oppose by force of arms the consolidation of the new constitution. Croatia and Slavonia and the Bánát refused to submit to the Hungarian rule, and demanded separate rights and autonomous administration; while in Transylvania, the diet of which had proclaimed its reunion with Hungary Proper, the Wallachs and Saxons rose in arms against the Magyars. The whole of the south and southwest of the country was soon in a state of revolt, and a war of races was carried on with indescribable fury. Representations to the court of Vienna remained virtually unheeded, the emperor contenting himself with hypocritical proclamations against the rebels, and with placing at the disposal of the Hungarian ministry a few regiments of soldiers, whose officers were disaffected to the Hungarian cause.

It now became evident that the Hungarians, in order to retain their national existence, must rely entirely upon their own resources, and make an immediate and vigorous effort, more especially as Jellachich, the newly appointed ban of Croatia, was making preparations to march upon Pest. Ferdinand, who still professed his determination to defend the integrity of the Hungarian monarchy, convoked the diet for July 5th, when it was opened by the palatine Stephen, as viceroy. At the suggestion of Kossuth a levy of 200,000 men and ample supplies for the purposes of national defense were unanimously voted; but to these measures Ferdinand withheld his assent. On September 6th a deputation of 100 members arrived at Vienna in order to urge upon the emperor the necessity of taking immediate and decisive steps to oppose the Croatian invasion. On September 9th they were admitted to an audience, but, receiving only an evasive answer, they straightway returned to Pest. The abortive result of the deputation, and an official report that Jellachich had crossed the Drave, were announced to the diet on September 11th, and brought matters to a crisis. A few days later the palatine archduke Stephen, who at the demand of the diet had set out for the camp, but failed in his efforts at mediation, fled to Austria. The emperor thereupon nominated Count Lamberg royal commissioner and commander-in-chief of all the military forces in Hungary (September 25th), but the diet pronounced his appointment illegal and invalid, and he was murdered on the Budapest bridge of boats by the infuriated populace (September 28th). The Batthyányi ministry now resigned, and a committee of national defense was formed under the presidency of Kossuth. On September 29th, Jellachich, who had advanced to within twenty-five miles of Buda, was defeated at Velencze, whence he fled toward Vienna during a three days' armistice that was granted to him by General Móga. Ferdinand now declared openly against the Hungarians, annulled the decrees of the diet, and nominated Jellachich generalissimo of the forces to be employed for the reduction of Hungary. While the Austrian Government, still further exasperated at the march of a Hungarian force to Schwechat (October 30th), was preparing for a general invasion, the Hungarian diet hastily equipped a large army to resist it. In the meantime a new Austrian ministry was formed at Vienna, and on December 2d Ferdinand was induced to resign the imperial throne. He was succeeded by his nephew, archduke Francis Joseph, son of Francis Charles, the heir-apparent, who refused to accept the crown. The Hungarian diet, however, protested against this dynastic change as unconstitutional.

On December 15th, the main body of the Austrian army under Prince Windischgrätz began to cross the western frontier of Hungary near Bruck on the Leitha, while the Hungarian army of the Upper Danube, commanded by Görgei, who had succeeded Móga, retreated in the direction of Moson (Wieselburg). On December 18th, the second Austrian army corps occupied Pozsony (Pressburg), which the Hungarian troops had evacuated, and upon the same day Jellachich, who commanded the first army corps, occupied Moson, compelling Görgei to withdraw toward Györ (Raab). Upon the occupation of this town by the Austrians, on December 27th, Görgei removed to Bábolna, where he hoped to effect a junction with Perczel, who had been ordered to reënforce him. But Perczel, being overtaken and defeated at Móor on December 29th, by the troops of the ban, was obliged to beat a hasty retreat toward Székesfehérvaár (Stuhlweissenburg). These reverses having rendered Budapest insecure, the diet and the committee of national defense on January 1, 1849, transferred their seat to Debreczen, and on the night of the 4th and 5th the Hungarian troops marched out of the capital, which on the following day was taken possession of by Windischgrätz. Perczel, who had gathered together the remains of his corps at Budapest, followed the government by way of Szolnok, while Görgei made a flank movement to the north and led his corps by a circuitous route through the Carpathians to join the army on the Theiss. Windischgrätz, mindful of Schwechat, and regarding the Hungarians as rebels, had refused to listen to a deputation headed by Count Batthyányi making proposals of peace, and Batthyányi himself was arrested. While the Austrian generals were making this rapid progress in Hungary Proper, the Polish general, Bem, had succeeded in organizing a large force in Transylvania, by means of which he reduced the refractory Wallachs to subjection, and drove the Austrians out of the principality, which had been forced to submit to General Puchner.

In the diet now held at Debreczen, Kossuth declared that the nation was on the verge of destruction and could only be saved by extraordinary measures. But the inactivity of Windischgrätz, who, instead of hastening onward to the Theiss, remained for several weeks at Pest, gave the committee of national defense time to concentrate its forces, procure war material, and make other provisions for a determined resistance. On February 12th, Görgei arrived at Kassa (Kaschau), and the two Hungarian armies could now act in concert. Meanwhile the national cause made little progress in the south, a great portion of which was in the hands of the enemy. On February 14th, the fortress of Eszék in Slavonia was lost to the Hungarians; that of Lipótvár (Leopoldstadt) in the north had already fallen on the 2d of the same month.

At length the main body of the Austrians under Windischgrätz advanced, and attacked the Hungarians under the Polish general, Dembinski, on February 26th and 27th at Kápolna. The battle, though obstinately contested, proved indecisive, and the Hungarians were obliged to retire beyond the Theiss in order to recruit their forces. A few days later, however, an Hungarian corps, withdrawn from the lower Danube, and commanded by Damjanics, routed the Austrians under Grammont at Szolnok (March 5th). Meanwhile the Russians, coming to the aid of the Austrians, had penetrated into Transylvania and occupied Nagyszeben (Hermannstadt) and Brassó (Kronstadt), but the Hungarians under Bem regained these fortresses on March 11th and 20th, and drove the Russians into Wallachia.

By the middle of March an army of 120,000 men, provided with excellent generals and ample artillery, was concentrated on the Theiss. Toward the end of the month the Hungarians crossed the river at various points, and advanced on the road to Pest, under the command of Görgei, Damjanics, Aulich, Klapka and others—Guyon having been nominated to the commandership of Komárom (Komorn), the relief of which was the ultimate object of the campaign. The leadership of the Hungarian forces had meanwhile passed from Dembinski to Vetter, on account of whose ill-health it was provisionally transferred, March 31st, to Görgei. From this time the Austrians had to endure a rapid succession of defeats—at Hatvan (April 2d), Tápió-Bicske (April 4th), Isaszeg (April 6th), Gödöllö (April 7th), and Vácz or Waitzen (April 10th). In consequence of these reverses Windischgratz was recalled, and the chief command of the Austrian troops was given to Baron Welden (April 12th). In order to prevent the relief of Komárom, Welden opposed the advance of Görgei with a force under Wohlgemuth, which was, however, defeated by Damjanics April 19th, at Nagy-Sarló, so that on the 22d the relief of the fortress of Komárom was effected upon the left bank of the Danube, Guyon having previously succeeded in passing through the hostile lines. The subsequent rout of the besieging forces at Uj-Szöny, April 26th, completed the discomfiture of the Austrians, and forced them to fly to the frontier. The ban Jellachich meanwhile retreated to Croatia, and nearly the whole country was once more in the hands of the Hungarians.

In the midst of these victories Kossuth proposed in the diet at Debreczen the dethronement of the Hapsburg dynasty, and upon April 14th an act to that effect was almost unanimously passed, although afterward unfavorably received by Görgei and a large portion of the army. The chief provocation to the passing of this extreme and, as it eventually proved, unfortunate measure was the promulgation of the new constitution, March 4th, by the emperor Francis Joseph, which made a *tabula rasa* of all the time-honored laws, rights, and privileges of Hungary. The substance of the declaration of independence was as follows: "That the house of Hapsburg, having violated the integrity of the kingdom, treacherously levied war against the nation, and called in the aid of a foreign power to accomplish its aims, has trampled under foot all the treaties that united it to Hungary, and is therefore declared forever excluded from the Hungarian throne." The form of government was to be settled afterward by the diet, but in the meantime Kossuth was nominated governor, the committee of national defense was dissolved, and a new responsible ministry formed under the presidency of Szemere.

It is generally admitted that, had the Hungarians followed up their victories by an immediate march upon Vienna, they would have been able to force the Austrian Government to terms, and thus have warded off the Russian invasion, the preparations for which were now being conducted upon an enormous scale. Instead, however, of acting on the offensive across the Austrian frontier, the Hungarian commander-in-chief, Görgei, after a few days' delay at Komárom, made a retrograde movement toward the Hungarian capital. On May 4th he arrived before Buda, which was still in the possession of the Austrians, but it was in vain that he summoned the commander Hentzi to surrender. On the 15th began the regular bombardment of the fortress, and on the 21st it was taken by assault. On June 5th, Kossuth made his entry into Pest, and the diet having adjourned its sittings at Debreczen, the government returned to the capital. Every preparation was now set on foot for a desperate defense against the combined armies of Russia and Austria, which by the middle of the month had completed their arrangements, and had begun to invade the country at various points. Prince Paskewitch advanced from Galicia at the head of the main body of the Russian army, consisting of over 100,000 men, while Haynau crossed the western frontier with an Austrian force of 60,000, supported by a Russian division of 12,000 under Paniutin. On the Drave and the Styrian frontier Nugent commanded 12,000, and near Eszék was Jellachich with 25,000 men. In Transylvania the combined Austrian and Russian forces under Puchner and Lüders amounted to 60,000; so that, including the garrisons of the fortresses in their hands, the allied forces were in all not less than 275,000 men with 600 guns. The whole available forces of Hungary did not amount to more than half this number. the army of the Upper Danube under Görgei being 50,000, that of Perczel and Vécsey in the south 30,000, the army of the north under Dembinski 12,000; while there were about 32,000 men under Bem in Transylvania, and a few thousands under Kacinczy in the county of Máramaros. On June 19th the Russian corps under Lüders burst through the Red Tower Pass into Transylvania, and, having defeated the Hungarians, took the fortress of Nagy-Szeben, while in the following month Brassó in like manner surrendered to the Austrians. Jellachich was, however, defeated on July 14th at Hegyes, and forced to retire from the Bácska. In the meantime Haynau's operations on the Danube met with general success, while the Russian main army advanced over Eperies and Kassa into the interior of the country. These disasters to the Hungarian cause were aggravated by the want of unanimity between the Hungarian commander-in-chief and the government, which, being again obliged to leave Pest, transferred its seat to Szeged (July 11th). After various sanguinary engagements with the invading forces in the vicinity of Komárom, Görgei on the night of July 12th left the fortress under the charge of Klapka. On the 15th and 17th Görgei encountered the Russians at Vácz, and proceeded thence over Vadkert, Losoncz, and Rimaszombat, where on the 21st the Russian offers of truce were refused. Görgei, closely followed, finally crossed the Theiss on July 28th near Tokay, whence he proceeded in direction of Nagyvárad (Grosswardein) by routes to the east of Debreczen. There, on August 2d, his first army corps under Nagy Sándor was defeated by the troops of Paskewitch. The government had meanwhile removed to Arad, which fortress, having previously surrendered to the Hungarians, was made the last point of general concentration. In Transylvania the army of Bem had been overpowered on July 31st at Segesvár (Schässburg); and in Hungary Proper Dembinski retreated first to Szeged and Szöreg, whence he was repulsed on August 5th by Haynau, and afterward to Temesvár. There on the 9th he suffered an overwhelming defeat. Upon the news of this catastrophe reaching Arad on the night of the 10th to 11th, Görgei, who had already arrived there on the 9th by forced marches from Nagyvárad, induced Kossuth and the few ministers who were with him to lay down their authority, and upon the 11th received from them the supreme civil and military command. On the evening of the same day, after the departure of Kossuth for Lugos, the new dictator, believing further resistance hopeless, communicated with the Russian general Rüdiger, offering to surrender at discretion. The sally of Klapka from Komárom, and his signal victory over the besieging Austrian army (August 3d), were unknown at Arad. On August 13th Görgei surrendered his army, consisting of some 24,000 men with 140 guns, to Rüdiger at Szöllös near Világos; on the 16th Kazinczy followed with his troops, and on the 17th Damjanics gave up the fortress of Arad, and on September 5th a similar fate befell Peterwardein.

A few thousand men followed Bem and Guyon to Turkey, whither Kossuth and the late ministers Szemere, Casimir Batthyányi, and Mészáros, and the military leaders Dembinski, Vetter, Perczel, Kmetty, and Wysocki also escaped. On October 2d to 5th Komárom capitulated on honorable terms, General Klapka having refused to surrender until an amnesty and free passports had been granted by the Austrians. On October 6th Aulich, Damjanics, Dessewffy, Kiss, Knézich, Lahner, Lázár, Leiningen, Nagy-Sándor, Pöltenberg, Schweidel, Török, and Vécsey met their end at Arad. On the same day Count Louis Batthyányi, and subsequently Prince Woronieczki, Baron Jeszenak, Csányi, Perényi, and others suffered at Pest. By a decree of Haynau, to whom the Russians had delivered up the prisoners of war, all officers below the rank of general, if not consigned to prison, were pressed as privates into the Austrian service. The Hungarian commander-in-chief Görgei, however, was pardoned, and interned at Klagenfurt in Carinthia.

Hungary now lay entirely prostrate, and was treated as a conquered country. The Russians retreated to the north and east, leaving the Austrians with their commander, Haynau, who availed himself of the summary powers conferred on him by the state of siege, to inflict the greatest cruelties on the vanquished people. Many of the Hungarian nobility were condemned to long terms of imprisonment; the estates of the richer patriots were confiscated; and numerous Austrian and Bohemian officials were thrust upon the exhausted country. A rigorous censorship of the press was at the same time enforced. At length, in July, 1850, Haynau was removed from the chief authority. A milder régime was inaugurated by the archduke Albrecht, who arrived at Pest on October 14, 1851, as the new civil and military governor. But it was only after the visit of the emperor to Hungary (June 5 to August 14, 1852), that the military courts were closed. The whole country, now reduced to a province of the Austrian empire, was placed under the direct control of the central government at Vienna. On May 1, 1853, the new organization was carried into effect, and the Austrian civil code made applicable to Hungary. On September 8th, the Hungarian insignia of royalty, which had disappeared from Arad at the time of Kossuth's flight, were discovered in the neighborhood of Orsova; they were conveyed on the 19th to Vienna, but were afterward transferred to Buda. On April 17, 1854, the state of siege was abolished, and on July 12, 1856, an amnesty was proclaimed. On May 4th of the following year the emperor visited Hungary, and on the 9th of the same month granted the restoration of their confiscated estates to late political offenders. In August he commenced a second progress through his Hungarian dominions, and availed himself of the opportunity to express his sentiments of consideration for the people.

Indeed, from this time (1857) both the emperor and the government of Vienna seemed desirous of making the Hungarians forget the troubles of 1848 and 1849 by concessions to the national will, while the encouragement given to improvements in the means of communication, and to the new projects for the regulation of the Theiss, as also the schemes for the colonization of sparsely populated districts, are well worthy of notice. During the year the railways from Szeged to Temesvár and from Szolnok to Debreczen were opened. By an imperial decree issued at the end of 1858 agricultural colonists, if of one nationality and creed, were allowed to settle in various parts of Hungary, with special exemptions from taxation. By a ministerial order of August 8, 1859, the language used in the higher schools was for the future to be regulated according to circumstances of nationality, the predominance of German being thereby abolished. On the 21st of the same month the absolutist minister Bach was dismissed, in consequence of the ill success of the Italian war, which was attributed to his ill-advised policy against the various nationalities of the realm. The so-called "Protestant patent" of September 1st, which ostensibly granted the communes the free administration of their own educational and religious matters, was, however, the cause of much dissatisfaction, and more than 2,800,000 Protestants petitioned for its withdrawal. In April, 1860, the archduke Albrecht was at his own desire removed from the civil and military governorship of Hungary, and the master of the ordnance, Benedek, a native Magyar, was appointed in his stead. The Hungarian members in the Reichsrath, specially summoned for the purpose of finding a definite form of settlement for the whole empire, now put forward claims for the autonomy of their country, and by an imperial diploma of October 20th their wishes were partly met. Benedek was removed from the general governorship of the kingdom; while the Hungarian court chancellery was restored, and Baron Vay nominated chancellor. At the same time the *curia regia* (supreme court of judicature) and the county assemblies were reinstituted, and Magyar recognized as the official language. Furthermore, the emperor on December 27th granted the reannexation of the Temesvár Bánát to Hungary Proper. In the following February it was decreed that their former constitutions should be restored to Hungary, Transylvania, and Croatia and Slavonia, and on April 6th the diet met at Buda, afterward removing to Pest. But as the address sent to Vienna in June demanded the fullest autonomy for Hungary, and the Hungarians refused to yield their claims, in spite of the emperor's declared inability to accede, the diet was dissolved by imperial decree on August 22d. Meanwhile a new Hungarian court chancellor had been appointed in the person of Count Forgách. Stringent measures were taken by the government of Vienna to counteract the organized passive resistance of the counties, and in many places the payment of the taxes was enforced by military aid. On October 27th the holding of all public county meetings was forbidden, and administrators or coadjutors were in many counties thrust upon the lord-lieutenants, who were forced to submit to the authority of the newly appointed government superintendent, Count Pálffy de Erdöd. On November 18, 1862, a general amnesty was granted to those who were implicated by their hostility to the late government measures. In the summer of 1863 Hungary suffered from a severe famine, but the Reichsrath voted 20,000,000 florins to alleviate the distress. On April 22, 1864, Count Forgách was replaced by Count Arminius Zichy, who, on account of his unpopularity, was on June 26, 1865, removed for Count George Majláth, a Conservative. In a visit to Budapest, June 6 to 9, 1865, the emperor declared his willingness to do justice to the constitutional demands of the Hungarians, as far as was consistent with the integrity of the empire. On July 18th Count Pálffy de Erdöd was replaced by Baron Sennyey, one of the leaders of the old Conservative party. On December 14th the diet was opened by the emperor in person, who assented to the principle of self-government for Hungary, and agreed to recognize the Pragmatic Sanction as the basis of a settlement of the questions involved. The diet, however, demanded also an acknowledgment of the continuity of the constitutional rights of 1848. After the outbreak of the war between Austria and Prussia the diet was prorogued (June 26, 1866). Upon its reopening on November 19th an imperial rescript was read in which the emperor acquiesced in the Hungarian demands for constitutional self-government, and promised to appoint a responsible ministry. The result of the "compromise" effected by Baron Beust between the Austrian Government and the committee, headed by Deák, empowered by the Hungarian diet, was the dualistic system of the Austrian-Hungarian monarchy, as finally sanctioned, February 18, 1867. This arrangement secured to Hungary the restoration of the constitutional, legal and administrative autonomy of 1848, while the supreme command and direction of the army were assigned to the emperor-king. A responsible ministry, including Barons Wenckheim and Eötvös, Count Mikó, Melchior Lónyay and others, was formed February 20, 1867, under the presidency of Count Andrássy. On June 8th, following, the emperor and empress were crowned king and queen of Hungary at Budapest, and a complete pardon was proclaimed to all political offenders both at home and abroad.

The reconciliation of the Magyars with the Hapsburg dynasty being thus complete, both parties sought to throw a veil over the past by mutual concessions. Transylvania was incorporated with Hungary Proper, and a joint commercial contract was entered upon between Hungary and Austria. In like manner foreign affairs and joint finance were assigned to "common ministries." On August 8, 1868, the Hungarian house of representatives accepted the dual government military scheme, by which the standing army remained under the direction of the imperial ministry of war. The *Honvéd* (home-defense) army obtained its own special organization and commander-in-chief. The long-existing misunderstanding between Hungary and Croatia was at length settled by the agreement concluded in September, which placed the relations of Croatia to the Hungarian crown on a more equable footing than hitherto. After the passing of various other measures of reform, including the emancipation of the Jews, a compulsory education act, and a special act (November 29th) for the consolidation of all nationalities under the crown of St. Stephen, the session of the Hungarian diet was closed on December 10, 1868. In the elections for the next session (1869–72) the Deák party, which had taken the lead in the previous diet, were returned by a large majority, and in the new diet, opened April 23, 1869, the policy of conciliation still prevailed. The ministry from time to time underwent certain modifications, owing to the death of Baron Eötvös, the minister of education (February, 1871), the appointment of Count Lónyay (May, 1870) to the imperial ministry of finance, and his subsequent nomination to the presidency of the Hungarian council in the place of Count Andrássy, who in November, 1871, succeeded Beust as foreign minister of Austria-Hungary. Meanwhile the finances of Hungary were becoming rapidly embarrassed owing to the repeated contraction since 1867 of enormous loans for state railways and costly public works. The elections of 1872 were, however, again favorable to the Deák faction. At the end of November Lónyay retired from the presidency of the ministry, and on December 1st was succeeded by Szlávy, who in March, 1873, obtained the consent of the diet to some additional taxes. In August the Military Frontier districts were placed under civil jurisdiction, the eastern portion or the Servian-Bánát frontier being incorporated with Hungary Proper. The new cabinet was not more fortunate than that which had preceded it in a solution of the financial question, and in March, 1874, made room for a coalition ministry under Bittó, with Ghyczy as finance minister. Upon its resignation in February, 1875, in consequence of the refusal of the house to grant further taxation, a strong liberal combination was formed by Tisza from members of the left and of the former Deák party. The new ministry, under the presidency of Wenckheim (March 3d), was supported by an overwhelming majority in the elections for the new session (1875–78). On October 16th Tisza, minister of the interior, was nominated president, and the financial difficulty was met by an advance in the income tax, and a fresh loan. The death of Deák, January 29, 1876, cast a gloom over the whole country. For some time previously he had withdrawn from the field of politics, where less moderate but more distinctly Magyarizing tendencies now prevailed. By its resolutions of March 24 and 27, 1876, the diet deprived of their former privileges the so-called "Saxon" sees and districts in Transylvania. From these new counties were formed on the system adopted for the rest of Hungary, and were placed under the general administration. The number of royal free towns in Hungary was, moreover, much reduced, especially in the Transylvanian circle. The insurrectionary state of the Slavic provinces of Turkey excited the apprehensions of the Magyars with regard to the Slav races of southern Hungary, and aroused a strong feeling of sympathy for the Porte. This was still further increased by the attitude of Russia, and the cordiality toward the Magyars evinced by the sultan Abdul Hamid II., who in 1877 presented the university of Budapest with a portion of the remains of the library of Matthias Corvinus. During the course of the war between Turkey and Russia the Magyars were with difficulty restrained from open manifestations in favor of the former and against the latter power. Nevertheless, after the conclusion of peace, Hungary had, in conformity with the requirements of Art. XXV. of the Berlin Treaty (July, 1878), to furnish her quota of troops for the occupation of Bosnia and the Herzegovina, a task effected only with a considerable loss of men, and an additional burden on the state finances. The diet having been closed by the king on June 30th, the new elections were held at the time the struggle for the occupation of Bosnia was progressing. The popular excitement in Hungary Proper was very great, both on account of the losses suffered by the Hungarian troops and the destruction by a violent thunderstorm of the town of Miskolcz. On October 3d Széll, minister of finance, resigned office; other ministers also tendered their resignations, but were induced to retain their posts for a time. In the elections the majority of votes had fallen to the Liberal or Government party. On October 20th the Hungarian parliament was opened, and at the beginning of December the reconstruction of the ministry was completed, the only new members being, for finance, Count Szapáry, and for commerce Baron Kemény. On the 14th a sum of 20,000,000 florins was granted for the occupation expenses of the following year.

Early in the spring of 1879 the attention of all parties was for a time distracted from political matters by the disastrous inundation of Szeged. At the beginning of May the friendly relations of the non-Magyar nationalities of Hungary, and more particularly of the Roumanians of Transylvania, toward the Magyars seemed to be endangered by the passing of the amended education bill ordering the state language to be taught in all the non-Magyar primary schools. The new law, as affecting many nationalities, is likely to have an important bearing on the future of Hungary. The urgent necessity for more extended river embankments and a better system of dykes and dredging in the water-coursed levels of the midland Trans-Tisian counties became more than ever apparent in December, when inundations of the triple Körös and the Maros submerged many villages, farms, and pasturages, devastated large portions of Nagyvárad (Grosswardein), Arad, and other low-lying communes, and rendered thousands of persons homeless. Some years ago a loan of 40,000,000 florins was raised for the purposes of regulating the Theiss and the Maros, and of rebuilding and securing the town of Szeged.

HUNS. The authentic history of the Huns in Europe practically begins about the year 372 A.D., when under a leader named Balamir (or, according to some MSS., Balamber) they began a westward movement from their settlements in the steppes lying to the north of the Caspian. After crushing, or compelling the alliance of, various nations unknown to fame (Alpilzuri, Alcidzuri, Himari, Tuncarsi, Boisci), they at length reached the Alani, a powerful nation which had its seat between the Volga and the Don; these also, after a struggle, they defeated and finally enlisted in their service. They then proceeded, after a short interval, in 374, to invade the empire of the Ostrogoths (Greuthungi), ruled over by the aged Ermanaric, or Hermanric, who died (perhaps by his own hand) while the critical attack was still impending. Under his son Hunimund a section of his subjects promptly made a humiliating peace; under Withemir (Winithar), however, who succeeded him in the larger part of his domains, an armed resistance was organized; but it resulted only in repeated defeat, and finally in the death of the king. The representatives of his son Witheric put an end to the conflict by accepting the condition of vassalage. Balamir now directed his victorious arm still further westward against that portion of the Visigothic nation (or Tervingi) which acknowledged the authority of Athanaric. The latter entrenched himself on the frontier which had separated him from the Ostrogoths, behind the "Greutung-rampart" and the Dniester; but notwithstanding all his precautions he was surprised by the enemy, who forded the river in the night, fell suddenly upon his camp, and compelled him to abandon his position. Athanaric next attempted to establish himself in the territory between the Pruth and the Danube, and with this object set about heightening the old Roman wall which Trajan had erected in northeastern Dacia; before his fortifications, however, were complete, the Huns were again upon him, and without a battle he was forced to retreat to the Danube. The remainder of the Visigoths, under Alavivus and Fritigern, now began to seek and ultimately were successful in obtaining (376) the permission of the emperor Valens to settle in Thrace; Athanaric meanwhile took refuge in Transylvania, thus abandoning the field without any serious struggle to the irresistible Huns. For more than fifty years the Roman world was undisturbed by any aggressive act on the part of the new invaders, who contented themselves with overpowering various other tribes which lived to the north of the Danube. In some instances, in fact, the Huns actually lent their aid to the Romans against third parties; thus in 404–5 certain Hunnic tribes, under a chief or king named Uldin, assisted Honorius in the struggle with Radagaisus (Ratigar) and his Ostrogoths, and took a prominent part in the decisive battle which was fought in the neighborhood of Florence. Once indeed, in 409, they are said to have crossed the Danube and invaded Bulgaria under perhaps the same chief (Uldis), but extensive desertions soon compelled a retreat. About the year 432, a noteworthy Hunnic king, Ruas or Rugulas, is mentioned, who made himself of such importance that he received from Theodosius II. an annual stipend or tribute of 350 pounds of gold (£14,000), along with the rank of Roman general. Quarrels soon arose, partly out of the circumstance that the Romans had sought to make alliances with certain Danubian tribes which Ruas chose to regard as properly subject to himself, partly also because some of the undoubted subjects of the Hun had sought and found refuge on Roman territory; and Theodosius, in reply to an indignant and insulting message which he had received about this cause of dispute, was preparing to send off a special embassy when tidings arrived that Ruas was dead, and that he had been succeeded in his kingdom by Attila and Bleda, the two sons of his brother Mundzuk (433). Shortly afterward the treaty of Margus (not far from the modern Belgrade), where both sides negotiated on horseback, was ratified. By its stipulations the yearly stipendium or tribute payable to Attila by the Romans was doubled; the fugitives were to be surrendered, or a fine of £8 to be paid for each of those who should be missing; free markets, open to Hun and Roman alike, were to be instituted; and any tribe with which Attila might be at any time at war was thereby to be held as excluded from alliance with Rome. For eight years afterward there was peace so far as the Romans were concerned; and during this period probably it was that the Huns proceeded to the extensive conquests to which the contemporary historian Priscus so vaguely alludes in the words: "He (Attila) has made the whole of Scythia his own, he has laid the Roman empire under tribute, and he thinks of renewing his attacks upon Persia. The road to that eastern kingdom is not untrodden by the Huns; already they have marched fifteen days from a certain lake, and have ravaged Media." They also appear before the end of this interval to have pushed westward as far as to the Rhone, and to have come into conflict with the Burgundians. Overt acts of hostility, however, occurred against the Eastern empire when the town of Margus (by the treachery of its bishop), was seized and sacked (441), and against the Western when Sirmium was invested and taken. In 445 Bleda died, and two years afterward Attila, now sole ruler, undertook one of his most important expeditions against the Eastern empire; on this occasion he pushed southward as far as Thermopylæ, Gallipoli, and the walls of Constantinople; peace was cheaply purchased by tripling the yearly tribute (which accordingly now stood at 2,100 pounds of gold, or $420,000) and by the payment of a heavy indemnity besides. In 448 again occurred various diplomatic negotiations, and especially the embassy of Maximin, of which many curious details have been recorded by Priscus, his companion. Then followed, in 451, that westward movement across the Rhine which was only arrested at last, with terrible slaughter, on the Catalaunian plains (according to common belief, in the neighborhood of the modern Châlons, but more probably at a point some fifty miles to the southeast, near Mery-sur-Seine). The following year (452), that of the Italian campaign, was marked by such events as the sack of Aquileia, the destruction of the cities of Venetia, and finally, on the banks of the Mincio, that historical interview with Pope Leo I. which resulted in the return of Attila to Pannonia, where in 453 he died. Almost immediately afterward, the empire he had amassed rather than consolidated fell to pieces. His too numerous sons began to quarrel about their inheritance, while Ardaric, the king of the Gepidæ, was placing himself at the head of a general revolt of the dependent nations. The inevitable struggle came to a crisis near the river Netad in Pannonia, in a battle in which 30,000 of the Huns and their confederates, including Ellak, Attila's eldest son, were slain. The nation, thus broken, rapidly dispersed; one horde settled under Roman protection in Little Scythia (the Dobrudscha), others in Dacia Ripensis (on the confines of Servia and Bulgaria) or on the southern borders of Pannonia. The main body, however, appeared to have resumed the position on the steppes of the river Ural which they had left less than a century before; soon afterward they reappeared in history as the Bulgari, divided into two sections, the Kuturguri, and the less formidable Uturguri, who for more than seventy years (485–557) were a constant source of annoyance and danger to the Eastern empire, until they themselves fell under the rising power of the Avars. About the year 630 they succeeded in regaining their independence, under the leadership of a chief named Krobat, or more properly Kubrat, a person of great consequence, who made a treaty with the emperor Heraclius. After his death his dominions, according to Theophanes (who wrote about 800 A.D.), were divided among his five sons, of whom the eldest, Batbaias, remained with his own people near the Mæotis, while the third, Asperuch, crossed the Danube. At a later period the first of these divisions came into close relations with the Khazars on the Volga, and their territory is spoken of as Great Bulgaria.

We have no adequate philological data for conclusively determining the ethnological position of the ancient Huns; and, in the attempt to solve the problem by other means, the student is at all points much hampered by the vagueness and inaccuracy with which designations, apparently ethnological, are applied by ancient writers. Their subsequent history is very obscure; but it appears that one section of them fled westward and settled in the neighborhood of the Ural river, and the extremely tempting hypothesis of De Guignes is that these were the direct ancestors of the Huns, who three centuries afterward began, under Balamir, to exercise so formidable an influence on the affairs of Europe. If so, then the Huns in all probability belonged to the Turkish branch of the great Turanian race.

According to the totally distinct line of investigation followed by Roseler, however, the Bulgarians, and therefore the Huns whose descendants they were, are to be regarded as of Finnic origin. It has only to be added that by mediæval writers, both Byzantine and Western, the word Hun is used much as the word Scythian was used by the ancients, with the utmost generality. No very close connection can be made out between the Huns and Magyars who first became prominent about the ninth century and who were undoubtedly Finns.

HUNT, James Henry Leigh, one of the most delightful of English essayists and miscellaneous writers, and especially remarkable for his connection with the most eminent literati of his time, was born at Southgate, October 19, 1784. He was educated at Christ's Hospital, of which school as it existed in his time he has left a lively account in his autobiography. An impediment in his speech, afterward removed, prevented his being sent to the university. He began to write for the newspapers, published a volume of theatrical criticisms in 1807, and in 1808 quitted the War Office, where he had for some time filled a situation as clerk, to assume the editorship of the *Examiner* newspaper, a speculation of his brother John. In 1816 he made a permanent mark in English literature by the publication of his *Story of Rimini*. Hunt left England for Italy in November, 1821, but storm, sickness, and misadventure retarded his arrival until June, 1822, a rate of progress which Peacock appropriately compares to the navigation of Ulysses.

Hunt's arrival in Italy was almost immediately followed by the tragic death of Shelley. Hunt was now virtually a dependent upon Byron, and in 1823 Byron sailed for Greece, leaving his coadjutor at Genoa to shift for himself. The Italian climate and manners, however, were entirely to Hunt's taste, and he protracted his residence until 1825, producing in the interim his matchless translation of Redi's *Bacco in Toscana*, and the religious work subsequently published under the title of *The Religion of the Heart*. In 1825 an unfortunate litigation with his brother brought him back to England, and in 1827 he committed the greatest mistake of his life by the publication of his *Lord Byron and his Contemporaries*. The book's reception was even more unfavorable than its deserts. British manliness and British cant were for once equally shocked, and the author especially writhed under the withering satire of Moore. For many years ensuing, the history of Hunt's life is that of a painful struggle with poverty and sickness. He worked unremittingly, but one effort failed after another. Two periodical ventures, the *Tatler* and the *London Journal*, were discontinued for want of subscribers, although in the latter Leigh Hunt had able coadjutors, and it contained some of his best writing. His editorship of the *Monthly Repository*, in which he succeeded W. J. Fox, was also unsuccessful. In 1840 his circumstances were improved by the successful representation of his *Legend of Florence*, a play of great merit, although it has not maintained itself upon the stage. *Lover's Amazements*, a comedy, was acted several years afterward; and other plays are extant in MS. The pretty narrative poem of *The Palfrey* was published in 1842; and about this time he began to write for the *Edinburgh Review*. In 1844 he was further benefited by the generosity of Mrs. Shelley and her son, the late baronet, who, on succeeding to the family estates, settled an annuity of £120 upon him; and in 1847 Lord John Russell procured him a civil list pension of £200. The fruits of the improved comfort and augmented leisure of these latter years were visible in the production of some charming volumes. Foremost among these are the companion books, *Imagination and Fancy* and *Wit and Humor*. His companion volume on the pastoral poetry of Sicily, quaintly entitled *A Jar of Honey from Mount Hybla*, is almost equally delightful. *The Town* and *Men, Women, and Books* are partly made up from former material. The *Old Court Suburb* is an anecdotic sketch of Kensington, where he long resided before his final removal to Hammersmith. In 1850 he published his autobiography, a naive and accurate piece of self-portraiture, full of affectations, but on that very account free from the affectation of unreality. It is more chary of portraits of contemporaries than might have been expected, but contains very detailed accounts of some of the most interesting periods of the author's life, his education at Christ's Hospital, his imprisonment, and his residence in Italy. In 1855 his narrative poems, original and translated, were collected under the title of *Stories in Verse*, with an interesting preface. He died at Putney, on August 28, 1859.

HUNT, William Henry, water-color painter, was born near Long Acre, London, March 28, 1790. He died of apoplexy, February 10, 1864.

HUNTER, John—as physiologist and surgeon combined, unrivaled in the annals of medicine—born February 13, 1728, at Long Calderwood, in the parish of East Kilbride, Lanarkshire, was the youngest of ten children of John and Agnes Hunter. Hunter is said to have made but little progress at school, being adverse to its restraints and pursuits, and fond of country amusements. When seventeen years old he repaired to Glasgow, where he for a short time assisted his brother-in-law, Mr. Buchanan, a cabinetmaker, who had involved himself in pecuniary difficulties. Being desirous at length of some settled occupation, he obtained from his brother William permission to aid, under Mr. Symonds, in making dissections in his anatomical school, then the most celebrated in London, intending, should he be unsuccessful there, to enter the army. He arrived accordingly in the metropolis in September, 1748, about a fortnight before the commencement of his brother's autumnal course of lectures. After succeeding beyond expectation with the dissection of the muscles of an arm, he was intrusted with a similar part injected, and from the excellence of his second essay Doctor Hunter predicted that he would become a good anatomist. Seemingly John Hunter had hitherto received no instruction in preparation for the special course of life upon which he had entered.

Hard-working, and singularly patient and skillful in dissection, Hunter had by his second winter in London acquired sufficient anatomical knowledge to be intrusted with the charge of his brother's practical class, with the members of which, as also with the resurrection men, he was a universal favorite. In the summer months of 1749-50, at Chelsea Military Hospital, he attended the lectures and operations of Cheselden, on whose retirement in the following year he became a surgeon's pupil at St. Bartholomew's, where Pott was one of the senior surgeons. In the summer of 1752 he visited Scotland. Home and, following him, Ottley state that Hunter began in 1754 to assist his brother as his partner in lecturing; according, however, to the *European Magazine* for 1782, the office of lecturer was offered to Hunter by his brother in 1758, but declined by him on account of the "insuperable embarrassments and objections" which he felt to speaking in public. In 1754 he became a surgeon's pupil at St. George's Hospital, where he was appointed house-surgeon in 1756.

An attack of inflammation of the lungs in the spring of 1759, apparently caused by overwork, having produced symptoms threatening consumption, by which the promising medical career of his brother James had been cut short, Hunter, with a view to residence abroad for a season, obtained from Mr. Adair in October, 1760, the appointment of staff-surgeon in Hodgson and Keppel's expedition to Belleisle. With this he sailed in 1761. In the following year he served with the English forces on the frontier of Portugal. While with the army he acquired the extensive knowledge of gunshot wounds embodied in his important treatise on that subject, published in 1794, in which, among other matters of moment, he insists on the rejection of the indiscriminate practice of dilating with the knife followed almost universally by surgeons of his time.

On arriving in England early in 1763, Hunter, having retired from the army on half-pay, took a house in Golden Square, and commenced the career of a London surgeon. In connection with his rupture of a tendo Achillis, in 1767, he performed on dogs several experiments which, with the illustrations in his museum of the reunion of such structures after division, laid the foundation of the modern practice of cutting through tendons for the relief of distorted and contracted joints. In the same year he was made a fellow of the Royal Society. Hunter, on December 9, 1768, was elected a surgeon to St. George's Hospital, and, soon after, a member of the Corporation of Surgeons. He now began to take house-pupils. Among these were Edward Jenner, who came to him in 1770, and until the time of Hunter's death corresponded with him on the most intimate and affectionate terms, W. Guy, Kingston, Doctor Physick of Philadelphia, and Everard Home, his brother-in-law. Mr. Lynn and Sir A. Carlisle, though not inmates of his house, were frequent visitors there. His pupils at St. George's included Abernethy, Cline, James Earle, and Astley Cooper. From the high reputation in their profession which these, one and all, attained, some estimate may be formed of the weight and value of Hunter's personal influence and teaching. In 1770 he settled in Jermyn Street, in the house which his brother William had previously occupied; and in July, 1771, he married Anne, the eldest daughter of Mr. Robert Home, surgeon to Burgoyne's regiment of light-horse.

From 1772 till his death Hunter resided during autumn at a house built by him at Earl's Court, Brompton, where most of his biological researches were carried on. There he kept for the purpose of study and experiment the fishes, lizards, blackbirds, hedgehogs, and other animals sent him from time to time by Jenner, tame pheasants and partridges, at least one eagle, toads, silkworms, and many more creatures obtained from every quarter of the globe. Bees he had under observation in his conservatory for upward of twenty years; hornets and wasps were also diligently studied by him. On two occasions his life was in risk from his pets — once in wrestling with a young bull, and again when he fearlessly took back to their dens two leopards which had broken loose among his dogs. Choosing intuitively the only true method of philosophical discovery, Hunter, ever cautious of confounding fact and hypothesis, besought of nature the truth through the medium of manifold experiments and observations. "He had never read Bacon," says Babington, "but his mode of studying nature was as strictly Baconian as if he had." To Jenner, who had offered a conjectural explanation of a phenomenon, he writes, August 2, 1775: "I think your solution is just; but why think? why not try the experiment? Repeat all the experiments upon a hedgehog as soon as you receive this, and they will give you the solution." Perhaps no man busily engaged in professional practice has ever conducted so many physiological and pathological investigations in the animal world as Hunter; and yet it was with him an axiom "that experiments should not be often repeated which tend merely to establish a principle already known and admitted, but that the next step should be the application of that principle to useful purposes." During fifteen years he kept a flock of geese simply in order to acquaint himself with the development of birds in eggs, with reference to which he remarked: "It would almost appear that this mode of propagation was intended for investigation." In his toxicological and other researches, in which his experience had led him to believe that the effects of noxious drugs are nearly similar in the brute creation and in man, he had already, in 1780, as he states, "poisoned some thousands of animals."

By inserting shot at definite distances in the leg-bone of young pigs, and also by feeding them with madder, by which all fresh osseous deposits are tinged, Hunter obtained evidence that bones increase in size, not by the intercalation of new among old particles, as had been imagined by Duhamel, but by means of additions to their extremities and circumference, excess of calcareous tissue being removed by the absorbents. Some of his most extraordinary experiments were to illustrate the relation of strength of constitution to sex. He exchanged the spurs of a young cock and a young pullet, and found that on the former the transplanted structure grew to a fair size, on the latter but little; whereas a spur from one leg of a cock transferred to its comb, a part well supplied with blood, grew more than twice as fast as that left on the other leg. Another experiment of his, which required many trials for success, was the engrafting of a human incisor on the comb of a cock. The uniting of parts of different animals when brought into contact he attributed to the production of adhesive instead of suppurative inflammation, owing to their possession of "the simple living principle." The effects of habit upon structure were illustrated by Hunter's observation that in a seagull which he had brought to feed on barley the muscular parietes of the gizzard became greatly thickened. A similar phenomenon was noticed by him in the case of other carnivorous birds fed on a vegetable diet.

It was in 1772 that Hunter, in order effectually to gauge the extent of his own knowledge, and also to correctly express his views, which had been repeatedly misstated or ascribed to others, commenced his lectures on the theory and practice of surgery, at first delivered free to his pupils and a few friends, but subsequent to 1774 on the usual terms, four guineas. His class was usually small, and never exceeded thirty. Among its members at various times were Abernethy, Carlisle, Chevalier, Cline, Coleman, Astley Cooper, Home, Lynn, and Macartney. Hunter was deficient in the gifts of a good extempore speaker, being in this respect a remarkable contrast to his brother William; and he read his lectures, seldom raising his eyes from the manuscript.

In January, 1776, Hunter was appointed surgeon-extraordinary to the king. He commenced in the same year his Croonian lectures on muscular motion, continued annually, except in 1777, till 1782; they were never published by him, being in his opinion too incomplete. In 1778 appeared the second part of his *Treatise* *on the Natural History of the Human Teeth*, the first part of which was published in 1771.

In 1783 Hunter was elected a member of the Royal Society of Medicine and of the Royal Academy of Surgery at Paris, and took part in the formation of "A Society for the Improvement of Medical and Chirurgical Knowledge."

Among the subjects of Hunter's physiological investigations in 1785 was the mode of growth of deer's antlers. As he possessed the privilege of making experiments on the deer in Richmond Park, he in July of that year had a buck there caught and thrown, and tied one of its external carotid arteries. He observed that the antler which obtained its blood supply therefrom, then half-grown, became in consequence cold to the touch. Hunter debated with himself whether it would be shed in due time, or be longer retained than ordinarily. To his surprise he found, on reëxamining the antler a week or two later, when he wound around the ligatured artery was healed, that it had regained its warmth, and was still increasing in size. Had, then, his operation been in some way defective? To determine this question, the buck was killed and sent to Leicester Fields. On examination Hunter ascertained that the external carotid had been duly tied, but that certain small branches of the artery above and below the ligature had enlarged, and by their anastomoses had restored the blood supply of the growing part. Thus it was evident that under "the stimulus of necessity," to use a phrase of the experimenter, the smaller arterial channels are capable of rapid increase in dimensions to perform the offices of the larger. It happened that, in the ensuing December, there lay in one of the wards of St. Georges' Hospital a patient of Hunter's, admitted for popliteal aneurism. The disease must soon prove fatal unless by some means arrested. Should the surgeon, following the usual and commonly fatal method of treatment, cut down upon the tumor, and, after tying the artery above and below it, evacuate its contents? Or should he adopt the procedure, deemed by Pott generally advisable, of amputating the limb above it? It was Hunter's aim in his practice, even if he could not dispense with the necessity, at least to diminish the severity of operations, which he considered were an acknowledgment of the imperfection of the art of healing, and compared to "the acts of the armed savage, who attempts to get that by force which a civilized man would get by stratagem." Since, he argued, the experiment with the buck had shown that collateral vessels are capable of continuing the circulation when passage through a main trunk is arrested, why should he not, in his aneurism case, leaving the absorbents to deal with the contents of the tumor, tie the artery in the sound parts, where it is tied in amputation, and preserve the limb? Acting upon this idea, he ligatured his patient's femoral artery in the lower part of its course in the thigh, in the fibrous sheath inclosing the space since known as "Hunter's canal." The leg was found, some hours after the operation, to have acquired a temperature even above the normal. At the end of January, 1786, that is, in six weeks' time, the patient was well enough to be able to leave the hospital. Thus it was that Hunter inaugurated an operation which has been the means of preserving to hundreds life with integrity of limb — an operation which, as the Italian Assalini, who saw it first performed, testifies, "excited the greatest wonder and awakened the attention of all the surgeons in Europe."

Early in 1786 Hunter published his *Treatise on the Venereal Disease*, which, like some of his previous writings, was printed in his own house. Although certain views therein expressed with regard to the relationship of syphilis have been proved erroneous, the work is a valuable compendium of observations of cases and modes of treatment. Toward the end of the year appeared his *Observations on certain parts of the Animal Œconomy*, which, besides the more important of his contributions to the *Philosophical Transactions*, contains nine papers on various subjects. By the death of Mr. Middleton in 1786, Hunter became deputy surgeon-general to the army; his appointment as surgeon-general and as inspector-general of hospitals followed in 1790, on the death of Mr. Adair. In 1787 he received the Royal Society's Copley medal as a testimony to the importance of his discoveries in natural history, and was also elected a member of the American Philosophical Society. On account of the increase of his practice and his impaired health, he now obtained the services of Home as his assistant at St. George's Hospital. The death of Pott in December, 1788, secured to Hunter the undisputed title of the first surgeon of England. He resigned to Home, in 1792, the delivery of his surgical lectures, in order to devote himself more fully to the completion of his *Treatise on the Blood, Inflammation, and Gunshot Wounds*, which was published by his executors in 1794. In this, his masterpiece, the application of physiology to practice is especially noticeable. Certain experiments described in the first part, pp. 62–64, which demonstrate that arterialization of the blood in respiration takes place by a process of diffusion of "pure air" or "vital air" (*i.e.*, oxygen) through membrane, were made so early as the summer of 1755.

Hunter in 1792 announced to his colleagues at St. George's, who, he considered, neglected the proper instruction of the students under their charge, his intention no longer to divide with them the fees which he received for his hospital pupils. Against this innovation, however, the governors of the hospital decided in March, 1793. Subsequently, by a committee of their appointing, a code of rules respecting pupils was promulgated, one clause of which, probably directed against an occasional practice of Hunter's, stipulated that no person should be admitted as a student of the hospital without certificates that he had been educated for the medical profession. In the autumn two young Scotchmen, ignorant of the new rule, came up to town and applied to Hunter for admission as his pupils at St. George's. Hunter explained to them how he was situated, but promised to advance their request at the next board meeting at the hospital on October 16th. On that day, having finished a difficult piece of dissection, he went down to breakfast in excellent spirits and in his usual health. After making a professional call, he attended the board meeting. There the interruption of his remarks in behalf of his applicants by a flat contradiction from a colleague brought on one of the old spasmodic heart attacks; he ceased speaking, and retired into an adjoining room only in time to fall lifeless into the arms of Doctor Robertson, one of the hospital physicians. After an hour had been spent in vain attempts to restore animation, his body was conveyed to his house in a sedan chair. Thus, in his sixty-fifth year, and in the height of his mental activity, died John Hunter, "whose range of thought nature alone could fill," and to whom, as to but few among all mankind, had been given wisdom to interpret the dark sayings of nature. His remains were interred privately on October 22, 1793, in the vaults of St. Martin's in the Fields. Thence, on March 28, 1859, through the instrumentality of Mr. Frank Buckland, they were removed to Abbot Islip's chapel in Westminster Abbey, to be finally deposited in the grave in the north aisle of the nave, close to the resting-place of Ben Jonson.

HUNTER, William, a celebrated physiologist and physician, and the first great teacher of anatomy in England, was born May 23, 1718, at East Kilbride, Lanark. He had originally been intended for the church, but, scruples concerning subscription arising in his mind, he followed the advice of his friend, William Cullen, and resolved to devote himself to physic. In 1746 Hunter undertook, in place of Mr. Samuel Sharpe, the delivery, for a society of naval practitioners, of a series of lectures on operative surgery, and so satisfactorily did he acquit himself of his task that he was requested to include anatomy in his course. It was not long before he attained considerable fame as a lecturer; for not only was his oratorical ability great, but he differed from his contemporaries in the fullness and thoroughness of his teaching, and in the care which he took to provide for his hearers the best possible practical illustrations of his discourses. In 1747 Hunter became a member of the Corporation of Surgeons. In the course of a tour through Holland to Paris, with his pupil, J. Douglas, in 1728, he visited Albinus at Leyden, and inspected with admiration his injected preparations. By degrees Hunter renounced surgical for obstetric practice, in which he excelled. He was appointed a surgeon-accoucheur at the Middlesex Hospital in 1748, and at the British Lying-in Hospital in the year following. The degree of M.D. was conferred upon him by the university of Glasgow, October 24, 1750. About the same time he left his old abode at Mrs. Douglas', and settled as a physician in Jermyn Street. He became a licentiate of the College of Physicians, September 30, 1756. In 1762 he was consulted by Queen Charlotte, and in 1764 was made physician-extraordinary to her Majesty.

During the closing ten years of his life his health failed greatly. His last lecture, at the conclusion of which he fainted, was given, contrary to the remonstrances of friends, only a few days before his death, which took place March 30, 1783. He was buried in the rector's vault at St. James', Piccadilly.

HUNTING. The circumstances which render necessary the habitual pursuit of wild animals, either as a means of subsistence or for self-defense, generally accompany a phase of human progress distinctly inferior to the pastoral and agricultural stages; resorted to as a recreation, on the other hand, the practice of the chase in most cases indicates a considerable degree of civilization, and sometimes ultimately becomes the almost distinctive employment of the classes which are possessed of most leisure and wealth. It is only in some of its latter aspects, viz., as a "sport," pursued on fixed rules and principles, that hunting requires notice here.

The information we possess as to the field sports of the ancients is in many directions extremely fragmentary. With regard to the ancient Egyptians, however, we learn that the huntsmen constituted an entire subdivision of the great second caste; they either followed the chase on their own account, or acted as the attendants of the chiefs in their hunting excursions, taking charge of the dogs, and securing and bringing home the game. The game was sought in the open deserts which border on both sides the valley of the Nile; but (by the wealthy) sometimes in inclosed spaces into which the animals had been driven, or in preserves. Besides the noose and the net, the arrow, the dart, and the hunting pole or *venabulum* were frequently employed. The animals chiefly hunted were the gazelle, ibex, oryx, stag, wild ox, wild sheep, hare, and porcupine; also the ostrich for its plumes, and the fox, jackal, wolf, hyena, and leopard for their skins, or as enemies of the farmyard. The lion was occasionally trained as a hunting animal instead of the dog. The sportsman appears, occasionally at least, in the later periods, to have gone to cover in his chariot or on horseback; according to Wilkinson, when the dogs threw off in a level plain of great extent, it was even usual for him "to remain in his chariot, and, urging his horses to their full speed, endeavor to turn or intercept them as they doubled, discharging a well-directed arrow whenever they came within its range." The partiality for the chase which the ancient Egyptians manifested was shared by the Assyrians and Babylonians, as is shown by the frequency with which hunting scenes are found depicted on the walls of their temples and palaces, and also by the alleged fact that even their dresses and furniture were ornamented with similar subjects. The game pursued included the lion, the wild ass, the gazelle, and the hare, and the implements chiefly employed seem to have been the javelin and the bow. There are indications that hawking was also known. The Assyrian kings also maintained magnificent parks, or "paradises," in which game of every kind was inclosed; and perhaps it was from them that the Persian sovereigns borrowed the practice mentioned both by Xenophon in the *Cyropædia*, and by Curtius. According to Herodotus, Cyrus devoted the revenue of four great towns to meet the expenses of his hunting establishments. The circumstances under which the death of the son of Crœsus is by the same writer related to have occurred incidentally show in what high estimation the recreation of hunting was held in Lydia.

Hunting scenes are frequently represented in ancient works of art, especially the boar-hunt, and also that of the hare. In Roman literature allusions to the pleasures of the chase (wild ass, boar, hare, fallow deer, being specially mentioned as favorite game) are not wanting; it seems to have been viewed, however, with less favor as an occupation for gentlemen, and to have been chiefly left to inferiors and professionals. The immense *vivaria* or *theriotropheia*, in which various wild animals, such as boars, stags, and roe-deer, were kept in a state of semi-domestication, were developments which arose at a comparatively late period; as also were the *venationes* in the circus, although these are mentioned as having been known as early as 186 B.C. The bald and meager poem of Gratius Faliscus on hunting is modeled upon Xenophon's prose work; a still extant fragment (315 lines) of a similiar poem with the same title, of much later date, by Nemesianus, seems to have at one time formed the introduction to an extended work corresponding to that of Oppian. That the Romans had borrowed some things in the art of hunting from the Gauls may be inferred from the name *canis gallicus* for a greyhound, which is to be met with both in Ovid and Martial; also in the word (*canis*) of Celtic origin. According to Strabo (p. 200) the Britons also bred dogs well adapted for hunting purposes. The addiction of the Franks in later centuries to the chase is evidenced by the frequency with which not only the laity but also the clergy were warned by provincial councils against expending so much of their time and money on hounds, hawks, and falcons; and we have similar proof with regard to the habits of other Teutonic nations subsequent to the introduction of Christianity. Originally among the northern nations sport was open to everyone except to slaves, who were not permitted to bear arms; the growth of the idea of game-preserving was a gradual one, and kept pace with the development of feudalism. The origin of the sport in Britain does not admit of being historically traced. Doubtless the early inhabitants shared to a large extent in the habits of the other Celtic people; the fact that at least they kept good hunting dogs is vouched for, as we have seen by Strabo. When the period of Alfred the Great is reached, we have it on the authority of Asserius, his biographer, that before he was twelve years of age he "was a most expert and active hunter, and excelled in all branches of that noble art, to which he applied with incessant labor and amazing success." Of his grandson Athelstan it is related by William of Malmesbury that after the victory of Brunanburgh he imposed upon the vanquished king of Wales a yearly tribute, which included a certain number of "hawks and sharp-scented dogs fit for hunting wild beasts." According to the same authority, one of the greatest delights of Edward the Confessor was "to follow a pack of swift hounds in pursuit of game, and to cheer them with his voice." It was under the Anglo-Saxon kings that the distinction between the higher and lower chase first came to be made — the former being expressly for the king or those on whom he bestowed the pleasure of sharing in it, while only the latter was allowed to the proprietors of the land. To the reign of Cnut belong the "Constitutiones de Foresta," according to which four thanes were appointed in every province for the administration of justice in all matters connected with the forests; under them were four inferior thanes to whom was committed immediate care of the vert and venison. The severity of the forest laws which prevailed during the Norman period is sufficient evidence of the sporting ardor of William and his successors. The Conqueror himself, we are told by his contemporaries, "loved the high game as if he were their father;" and the penalty for the unauthorized slaughter of a hart or hind was loss of both eyes.

In the great wilds of America game is so abundant that the elaborate preparations of the sportsman of the old world would be altogether superfluous, and the technology of the chase would be unintelligible jargon to the Western Nimrod. The principal requisites of the huntsman in this country, while of course varying with the class of game intended to fall before his onslaught, may in general terms be said to comprise a knowledge of the habits and habitat of the game sought, a steady nerve, and a proper equipment in the matter of arms and ammunition. In the great West in particular, the close intermingling of noble and ignoble game renders it imperative that the hunter, even while in quest of small game, shall be prepared for the emergency of unexpectedly facing quarry of a far different and more dangerous character than that which he starts out to bag. He may start out in quest of jackrabbits or "prairie chickens," but may walk unexpectedly into the comfortable embrace of a bear; in the far West the bear may be of the ferocious type *ursus horribilis*, or it may be may give place to its equally dangerous neighbor the "mountain lion." Thus it behooves the American sportsman to be fully acquainted with the fauna of the region in which he exploits, and to have at his ready command a weapon light enough for small game and yet powerful enough to kill the largest and most tenacious of life.

The various species of game offered by the country comprise an infinity of furred, feathered and hairy tribes. It may be said that no region of the vast continent is destitute of representatives of the three great classes mentioned. These call into requisition the shotgun of various bores and powers, and the rifle of varying weight, caliber, power and capacity for slow or quick firing. Some game requires the use of trained dogs to force it from cover, while with others it is only necessary for the hunter to tramp over the territory occupied by it and in the vernacular of the people "kick it up." In the Southern States quail are shot over dogs, or "flushed" as described. Deer may be raised from cover by trailing with dogs, or the hunter may elect to go on a "still hunt"—either mode being generally equally successful. Foxes are uniformly run with hounds, but never intentionally allowed to escape—their numbers being so great as to render thinning out desirable. Hares may be chased with dogs, which drive them toward the hunter, to be shot by him, or they may be "still hunted" mornings and evenings, when they come out to feed. Bears are sometimes trailed by hounds, but some species and individuals are too pugnacious to retreat before canine pursuers, in which case the dog is only useful to apprise the hunter of the whereabouts of the game. Black bears will usually retreat before the advance of dogs, but the grizzly is generally too dignified to leave any particular locality on account of such petty annoyance. In the Western States the dogs used by huntsmen are generally confined to those which trail feathered game. Elk, deer, moose, buffalo, mountain sheep, bears, and such larger game are uniformly "still-hunted," the hunter being usually armed with a repeating rifle of the heavier class and high power. Hunting in these regions is not only exciting sport, but becomes dangerous work in many cases, and the tyro should never set out on an expedition unattended. Even old, experienced frontiersmen often lose their lives, or limbs, in encounters with the terrible animals who make their lairs among the mountain fastnesses of the Rockies.

As to the armament of the American sportsman, a few general hints may be timely. In the older communities it is generally sufficient that the hunter carry a light fowling-piece, with such minor accessories as render his pursuit of game more convenient; but even in these localities if there be any cover afforded for larger animals it would be better and more prudent for him to carry with him a few extra cartridges of heavy shot with larger charges of powder. This precaution will not only render him able to bag larger game than that which he seeks, but will often stand him in good stead in the defense of his life against wild animals of a dangerous nature, unexpectedly encountered — a not infrequent circumstance in the heavily wooded portions of the Eastern and Southern States, where occasional specimens of bear, panther, wildcat, etc., are seen. In new, not long settled localities, the rifle (repeating) is a *sine qua non.* As before stated, it should be of sufficient caliber and power to be effective against the most dangerous animals, and yet be of such weight as not to be an excessive burden at the end of a long day's tramp. The charge both of powder and lead can be varied to suit the game sought, but it is the part of wisdom to be always ready for any emergency, and to this end a weapon should be selected in which the charge can be quickly changed as occasion may require. This item having received attention, the hunter should be careful to always have at hand a few cartridges of extra size. To this end, the most serviceable weapon for sportsmen is probably the Winchester—the "Express" for a country where dangerous game may be encountered. In this rifle cartridges of different degrees of strength and bullets of different weight can be used ("Express," solid or explosive), and while it can be used as a magazine rifle, it can also be loaded at the breech as an ordinary single shot breech-loader. This gives it great ease of change of charge in case any game requiring such change shall suddenly appear. There are other rifles in use, which claim to be equally good, but the majority of choice in the United States seems to be with the one mentioned.

In hunting in America the horse is rarely used, except in case of fox-hunting, the distances covered by game not being usually great, and the country being of such a nature as to preclude the use of the horse in following.

We also find that the elephant, hyena, hunting leopard, and a small species of panther known as the ounce are not only objects of chase, but are themselves trained to assist in the capture of other animals. The elephant has been found of great service in lion and tiger hunting, his size affording comparative safety to the hunters seated on his back. The hyena, which resembles a dog in many particulars, is said to be as tractable, when properly trained, and to be of much use in the pursuit of game. The hunting leopard or cheetah and the ounce are used in hunting a species of antelope. They have hoods put over their heads, and are taken in a small wagon into the field; when the deer is seen the hood is taken off and the animal starts in pursuit, followed by the hunter; when the game is secured the hood is again put on. In India field sports are largely indulged in, owing partly to natural facilities, and partly to the taste for hunting characteristic of the English residents there. Tigers are sometimes caught in traps, and sometimes shot in the jungle from the back of an elephant; they seek to conceal themselves, and very rarely commence hostilities against mankind, but when severely wounded and brought to bay they fight courageously. Hunting the wild hog, or "pig sticking," as it is often termed, is a favorite sport in India; the ground is walked over by beaters, and when a hog is roused the two mounted huntsmen nearest to him start in pursuit, and endeavor to spear him. The riding requires judgment and very good nerves; hollows, ravines, and cracks in the ground caused by the sun are numerous, and, as they are hidden by the tall grass, the horse cannot avoid them; it is said that no horse can run down a hog in less than a mile, even over the best ground, while over the rough country the distance traveled amounts to three or four. The rider's aim is to blow the hog sufficiently before getting within spearing distance—for the charge of an untired hog is a dangerous affair; but when near a thick cover the sportsman must try to spear him at all hazards, or make up his mind to lose him. The proper management of the spear requires considerable practice. Besides the above mentioned animals, the fox, jackal, wolf, hyena, buffalo, and four-horned antelope are also objects of the chase.

Australia was formerly the scene of a great deal of kangaroo hunting, but that animal is now comparatively scarce.

In Africa there is plenty of big-game hunting, the list including the elephant, lion, giraffe, hippopotamus, antelopes of various kinds, leopard, hyena, buffalo, jackal, and ostrich. Of these the larger and more dangerous animals are killed as opportunity offers, but the jackal is hunted by English settlers like a fox. Ostrich hunting is somewhat peculiar; the bird is pursued by men on horseback, and, though over the ground it is swifter than a horse, it generally runs in a large circle, so that the riders, by describing a smaller circle and relieving one another, are enabled to keep tolerably near to it, and so to ride it down.

In Russia, bears, wolves, and wild boars are hunted. Wolves are found in Germany, where they are not only hunted by properly trained wolf hounds, but are killed by any available means.

HUNTINGDON, or Hunts, an inland county of England, bounded on the north and west by Northampton, south by Bedford, and east by Cambridge. Its extreme breadth is at the middle, from which it narrows gradually and irregularly toward its north and south ends. Its extreme length from north to south is about thirty miles, and its extreme breadth from east to west about twenty-three miles. The area extends to 229,575 imperial acres, or 358 square miles. Among English counties it is the smallest, with the exception of Middlesex and Rutland; and Rutland is the only English county it surpasses in population. Pop. (1901), 54,127.

Huntingdon, a municipal and parliamentary borough of England, capital of the above county, is situated on the left bank of the Ouse, and on three railway lines, fifty-eight miles north of London, fifteen miles northwest of Cambridge, and nineteen miles south of Peterborough. Oliver Cromwell was born here in 1599, and here the poet Cowper lived from 1765 to 1767. Huntington has a population of 4,228.

HUNTINGDON, capital of the Pennsylvania county of the same name, is situated on the Juniata river, thirty-four miles east of Altoona and sixty miles from Harrisburg (ninety-eight by railroad). The town is picturesquely located in the mountains and is a place of considerable trade. It has a national and other banks, tanneries, flouring and planing mills, a car factory and a shoe factory, and issues several newspapers. Population (1900), 6,053.

HUNTINGTON, a post-town, capital of the county of the same name in Indiana, is situated on the Little river, twenty-four miles southwest of Fort Wayne and forty-eight miles east of Logansport. It has extensive water-power, which is utilized to run woolen mills and manufactories of staves and spokes. There are ten churches, a national and one other bank and two newspapers offices. Population (1900), 9,491.

HUNTINGTON, an enterprising and rapidly-growing city in Cabell county, W. Va., is situated on the Ohio river, below the mouth of the Guyandotte river and twenty miles above Ironton, Ohio. Of late years it has developed important manufacturing interests, including foundries, planing mills, manufactories of car wheels and other railroad supplies. It is the seat of Marshall College and of the State Normal School, and has good banking, telegraph and railroad facilities. Huntington has three newspapers, twelve churches and a population by the U. S. census of 1900 of 11,923, having added 1,815 to its numbers within the decade.

HUNTSVILLE, the county seat of Madison county, Ala., is situated in the valley of the Tennessee river, 100 miles south of Nashville, and in the heart of the Cumberland mountains. It is a flourishing town with a population (1900) of 8,068. Huntsville has a national and other banks, cotton factories, an ice-factory, cotton-seed mills and other industries, and has well-shaded streets, gas, water-works and a public park. The first State convention of Alabama was held here, and the first meeting of the legislature.

HUPFELD, Hermann, an eminent Orientalist and Biblical commentator and critic, was born March 31, 1796, at Marburg. He died at Halle, April 24, 1866.

HURD, Richard, bishop of Winchester, was born at Congreve, in the parish of Penkridge, Staffordshire, where his father was a farmer, on January 13, 1720 He died May 28, 1808.

HURDWAR. See Hardwâr.

HURON, Lake. See St. Lawrence.

HURRUR. See Harar.

HUSBAND AND WIFE. The history of Roman law exhibits a transition from an extreme theory to its opposite. The position of the wife in the earliest Roman household was regulated by the law of *Manus*. She fell under the "hand" of her husband,—became one of his family, along with his sons and daughters, natural or adopted, and his slaves. The dominion which, so far as the children was concerned, was known as the *patria potestas*, was, with reference to the wife, called the *manus*. The subject members of the family, whether wife or children, had, broadly speaking, no rights of their own, and were merged in the *potestas* of the husband and father. If this institution implied the complete subjection of the wife to the husband, it also implied a much closer bond of union between them than we find in the later Roman law. The wife was at least a member of the family, and on her husband's death she succeeded, like the children, to freedom and a share of the inheritance. *Manus*, however, was not essential to a legal marriage; its restraints were irksome and unpopular, and in course of time it absolutely ceased to exist, leaving no equivalent protection of the stability of family life. The later Roman marriage left the spouses comparatively independent of each other. The bond was easily dissolved, and while it lasted was loose and easy. The distance between the two modes of marriage may be estimated by the fact that, while under the former the wife was one of the husband's immediate heirs, under the latter she was called to the inheritance only after his kith and kin had been exhausted, and only in preference to the treasury. It seems doubtful how far she had, during the continuance of marriage, a legal right to enforce aliment from her husband, although if he neglected her she had the unsatisfactory remedy of an easy divorce. The law in fact preferred to leave the parties to arrange their mutual rights and obligations by private contracts. Hence the importance of the Law of Settlements (*Dotes*). The *Dos* and the *Donatio ante nuptias* were settlements by or on behalf of the husband or wife, during the continuance of the marriage, and the law seems to have looked with some jealousy on gifts made by one to the other in any less formal way, as possibly tainted with undue influence. During the marriage the husband had the administration of the property, and its destination afterward might depend on the nature of the settlement and the conduct of the parties.

The *manus* of the Roman law appears to be only one instance of an institution common to all primitive societies, and suitable only to society in a primitive state. On the continent of Europe after many centuries, during which local usages were brought under the influence of principles derived from the Roman law, a theory of marriage became established, the leading feature of which is the *community of goods* between husband and wife. Describing the principle as it prevails in France, Story says: "This community or nuptial partnership (in the absence of any special contract) generally extends to all the movable property of the husband and wife, and to the fruits, income, and revenue thereof. * * * * It extends also to all immovable property of the husband and wife acquired during the marriage, but not to such immovable property as either possessed at the time of the marriage, or which came to them afterward by title of succession or by gift. The property thus acquired by this nuptial partnership is liable to the debts of the parties existing at the time of the marriage; to the debts contracted by the husband during the community, or by the wife during the community with the consent of the husband; and to debts contracted for the maintenance of the family. * * * * The husband alone is entitled to administer the property of the community, and he may aliene, sell, or mortgage it without the concurrence of the wife." But he cannot dispose by will of more than his share of the common property, nor can he part with it gratuitously *inter vivos*. The community is dissolved by death (natural or civil), divorce, separation of body, or separation of property. On separation of body or of property the wife is entitled to the full control of her movable property, but cannot aliene her immovable property without her husband's consent, or legal authority. On the death of either party the property is divided in equal moities between the survivor and the heirs of the deceased.

The English common law has as usual followed its own course in dealing with this subject, and in no department are its rules more entirely insular and independent. The text-writers all assume two fundamental principles, which between them establish a system of rights totally unlike that we have just described. Husband and wife are said to be one person in the eye of the law. Hence a man cannot grant or give anything to his wife, because she is himself, and if there are any compacts between them before marriage they are dissolved by the union of persons. Hence, too, the old rule of law, now greatly modified, that husband and wife could not be allowed to give evidence against each other in any trial, civil or criminal. The unity, however, is one-sided only; it is the wife who is merged in the husband, not the husband in the wife. And when the theory does not apply, the disabilities of "coverture" suspend the active exercise of the wife's legal faculties. The old technical phraseology describes husband and wife as *baron* and *femme;* the rights of the husband are baronial rights. From one point of view the wife is merged in the husband, from another she is one of his vassals. A curious example is the immunity of the wife in certain cases from punishment for crime committed in the presence and on the presumed coercion of the husband. "So great a favorite," says Blackstone, "is the female sex of the laws of England."

In the United States the relation of husband and wife is a subject of State law, and the positions taken in the various States are so numerous and varied as to preclude mention in detail in this article. It may, however, be stated that the different States have founded their statutes on the subject on the English law, which is more or less modified to meet various exigencies arising in the experience of the people.

HUSCH, **Hushi**, or **Husi**, chief town of the Roumanian province of Falciu, Moldavia, is situated on the right bank of the Pruth, about forty miles southeast of Jassy. Population, 18,500.

HUSHIARPUR, a British district in the lieutenant-governorship of the Punjab, India. It forms the central district of the Jalandhar division, and is bounded northeast by the district of Kángra and the native state of Nálagarh, north and northwest by the river Bias, southwest by Jalandhar, and south by the river Satlaj (Sutlej) and Ambála (Umballa) district.

Hushiarpur, municipal town and administrative headquarters of the above district, is situated on the bank of a broad sandy torrent. The population in 1901 was about 16,000, comprising 6,350 Hindus, 6,002 Mohammedans, 119 Síkhs, 62 Christians, and 489 "others."

HUSS, **John**, the Bohemian reformer and martyr, was born at Hussinecz, a market-village at the foot of the Böhmerwald, and not far from the Bavarian frontier, most probably in 1369, and, according to some accounts, on July 6th. His parents appear to have been well-to-do Czechs of the peasant class. Of his early life nothing is recorded except that, notwithstanding the early loss of his father, he obtained a good elementary education, first at Hussinecz, and afterward at the neighboring town of Prachaticz. At, or only a very little beyond, the usual age he entered the recently (1348) founded university of Prague, where he became bachelor of arts in 1393, bachelor of theology in 1394, and master of arts in 1396. In 1398 he was chosen by the Bohemian "nation" of the university to an examinership for the bachelor's degree; in the same year he began to lecture also, and there is reason to believe that the philosophical writings of Wickliffe, with which he had been for some years acquainted, were his textbooks. In October, 1401, he was made dean of the philosophical faculty, and for the half-yearly period from October, 1402, to April, 1403, he held the office of rector of the university. In 1402 also he was made rector or curate (capellarius) of the Bethlehem Chapel, which had in 1391 been erected and endowed by some zealous citizens of Prague for the purpose of providing good popular preaching in the Bohemian tongue. This appointment, which, so far as the aims of the pious founders were concerned, proved a singularly successful one, had a deep influence on the already vigorous religious life of Huss himself; and one of the effects of the earnest and independent study of Scripture into which it soon led him was a profound conviction of the great value not only of the philosophical but also of the theological writings of Wickliffe.

This newly-formed sympathy with the English reformer did not, however, in the first instance at least, involve Huss in any conscious opposition to the established doctrines of Catholicism, or in any direct conflict with the authorities of the church; and for several years he continued to act in full accord with his archbishop (Sbynjek, or Sbynko, of Hasenburg). Thus in 1405 he, along with other two masters, was commissioned to examine into certain reputed miracles at Wilsnack, near Wittenberg, which had caused that church to be made a resort of pilgrims from all parts of Europe. The result of their report was that all pilgrimage thither from the province of Bohemia was prohibited by the archbishop on pain of excommunication, while Huss, with the full sanction of his superior, gave to the world his first published writing, entitled *De Omni Sanguine Christi Glorificato*, in which he declaimed in no measured terms against forged miracles and ecclesiastical greed, urging Christians at the same time to desist from looking for sensible signs of Christ's presence, but rather to seek Him in His enduring word. More than once also Huss, along with his friend Stanislaus of Znaim, was appointed to be synod-preacher, and in this capacity he delivered at the provincial councils of Bohemia many faithful admonitions. As early as May 28, 1403, it is true, there had been held a university disputation about the new doctrines of Wickliffe, which had resulted in the condemnation of certain propositions presumed to be his; five years later (May 20, 1408) this decision had been refined into a declaration that these, forty-five in number, were not to be taught in any heretical, erroneous, or offensive sense. But it was only slowly that the growing sympathy of Huss with Wickliffe unfavorably affected his relations with his colleagues in the priesthood. In 1408, however, the clergy of the city and archiepiscopal diocese of Prague laid before the archbishop a formal complaint against Huss, arising out of strong expressions with regard to clerical abuses of which he had made use in his public discourses; and the result was that, having first been deprived of his appointment as synodal preacher, he was, after a vain attempt to defend himself in writing, publicly forbidden the exercise of any priestly function throughout the diocese. Simultaneously with these proceedings in Bohemia, international negotiations had been going on which had for their object the removal of the long-continued papal schism, and it had in the interval become apparent that a satisfactory solution of the difficulties involved could only be secured if, as seemed not impossible, the supporters of the rival popes, Benedict XIII. and Gregory XII., could be induced, in view of the approaching council of Pisa, to pledge themselves to a strict neutrality. With this end King Wenceslaus of Bohemia had requested the cooperation of the archbishop and his clergy, and also the support of the university, in both instances unsuccessfully, although in the case of the latter the Bohemian "nation," with Huss at its head, had only been overborne by the votes of the Bavarians, Saxons, and Poles. There followed an expression of nationalist and particularistic as opposed to ultramontane and also to German feeling, which undoubtedly was of supreme importance for the whole of the subsequent career of Huss. In compliance with this feeling a royal edict (January 18, 1409) was issued, by which, in alleged conformity with Paris usage, and with the original charter of the university, the Bohemian "nation" received three votes while only one was allotted to the other three "nations" combined; whereupon all the foreigners, to the number of several thousands, almost immediately withdrew from Prague, an occurrence which led to the formation shortly afterward of the university of Leipsic.

It was a dangerous triumph for Huss; for his popularity at court and in the general community had been secured only at the price of clerical antipathy everywhere and of much German ill-will. Among the first results of the changed order of things were on the one hand the election of Huss (October, 1409) to be again rector of the university, but on the other hand the appointment by the archbishop of an inquisitor to inquire into charges of heretical teaching and inflammatory preaching which had been brought against him. He had spoken disrespectfully of the church, it was said, had even hinted that Antichrist might be found to be in Rome, had fomented in his preaching the quarrel between Bohemians and Germans, and had, notwithstanding all that had passed, continued to speak of Wickliffe as both a pious man and an orthodox teacher. The direct result of this investigation is not known, but it is impossible to disconnect from it the promulgation by Pope Alexander V., on December 20, 1409, of a bull which ordered the abjuration of all Wickliffite heresies and the surrender of all his books, while at the same time—a measure specially leveled at the pulpit of Bethlehem Chapel—all preaching was prohibited except in localities which had been by long usage set apart for that use. This decree, as soon as it was published in Prague (March 9, 1410), led to much popular agitation, and provoked an appeal by Huss to the pope's better informed judgment; the archbishop, however, resolutely insisted on carrying out his instructions, and in the following July caused to be publicly burned, in the courtyard of his own palace, upward of 200 volumes of the writings of Wickliffe, while he pronounced solemn sentence of excommunication against Huss and certain of his friends, who had in the meantime again protested and appealed to the new pope, (John XXIII.) Again the populace rose on behalf of their hero, who, in his turn, strong in the conscientious conviction that "in the things which pertain to salvation God is to be obeyed rather than man," continued uninterruptedly to preach in the Bethlehem Chapel, and in the university began publicly to defend the so-called heretical treatises of Wickliffe, while from king and queen, nobles and burghers, a petition was sent to Rome praying that the condemnation and prohibition in the bull of Alexander V. might be quashed. Negotiations were carried on for some months, but in vain; in March, 1411, the ban was anew pronounced upon Huss as a disobedient son of the church, while the magistrates and councilors of Prague who had favored him were threatened with a similar penalty in case of their giving him a contumacious support. Ultimately the whole city, which continued to harbor him, was laid under interdict; yet he went on preaching, and masses were celebrated as usual, so that at the date of Archbishop Sbynko's death in September, 1411, it seemed as if the utmost efforts of ecclesiastical authority had resulted in absolute failure.

The struggle, however, entered on a new phase with the appearance at Prague in May, 1412, of the papal emissary charged with the proclamation of the papal bulls by which a religious war was decreed against the excommunicated King Ladislaus of Naples. and indulgence was promised to all who should take part in it, on terms similar to those which had been enjoyed by the earlier crusaders to the Holy Land. By his bold and thorough-going opposition to this mode of procedure against Ladislaus; and still more by his doctrine that indulgence could never be sold without simony, and could not be lawfully granted by the church except on condition of genuine contrition and repentance, Huss at last isolated himself, not only from the archiepiscopal party under Albik of Unitschow, but also from the theological faculty of the university, and especially from such men as Stanislaus of Znaim and Stephen Paletz, who until then had been his chief supporters. A popular demonstration, in which the papal bulls had been paraded through the streets with circumstances of peculiar ignominy and finally burnt, led to intervention by Wenceslaus on behalf of public order; three young men, for having openly asserted the unlawfulness of the papal indulgence after silence had been enjoined, were sentenced to death (June, 1412); the excommunication against Huss was renewed, and the interdict again laid on all places which should give him shelter—a measure which now began to be more strictly regarded by the clergy, so that in the following December he had no alternative but to yield to the express wish of the king by temporarily withdrawing from Prague. A provincial synod, held at the instance of Wenceslaus in February, 1413, broke up without having reached any practical result; and the labors of a commission appointed shortly afterward were equally unsuccessful in the attempt to bring about a reconciliation between Huss and his adversaries. The so-called heretic meantime spent his time partly at Kozihradek, some forty-five miles south of Prague, and partly at Krakowitz in the immediate neighborhood of the capital, sometimes varying the monotony of his life with an occasional course of open-air preaching, but finding his chief employment in maintaining with his numerous friends that copious correspondence of which some precious fragments still are extant, and in the composition of the largest and most exhaustive of all his printed works, *De Ecclesia*, which subsequently furnished most of the material for the capital charges brought against him.

During the year 1413 the arrangements for the meeting of a general council at Constance were agreed upon between Sigismund and Pope John XXIII. The objects originally contemplated had been the restoration of the unity of the church and its reform in head and members; but so great had become the prominence of Bohemian affairs that to these also a first place in the programme of the approaching œcumenical assembly required to be assigned, and for their satisfactory settlement the presence of Huss was obviously necessary. His attendance was accordingly requested, and the invitation was willingly accepted as giving him a long-wished-for opportunity both of publicly vindicating himself from charges which he felt to be grievous and of loyally making confession for Christ. He set out from Bohemia on October 14, 1414, not, however, until he had carefully ordered all his private affairs, with a presentiment, which he did not conceal, that in all probability he was going to his death. The journey, which appears to have been undertaken with the usual passport, and under the protection of several powerful Bohemian friends (John of Chlum, Wenceslaus of Duba, Henry of Chlum) who accompanied him, was a very prosperous one; and at almost all the halting places he was received with a consideration and enthusiastic sympathy which he had hardly expected to meet with anywhere in Germany. On November 3d he arrived at Constance, and took up quarters in the house which is still pointed out (Paulsgasse, 328); shortly afterward there was put into his hands the famous imperial "safe conduct," the promise of which had been one of his inducements to quit the comparative security he had enjoyed in Bohemia. Of this safe conduct, the formal words of which have often been quoted, it would be absurd to say that it was intended to guarantee its holder against the infliction of due punishment should he be convicted by existing laws of any crime; but there can be no doubt that both the letter and the spirit of it were scandalously violated, when, on November 28th, Huss was arbitrarily seized and thrown into prison before any accusation whatever had been formulated. Sigismund himself never sought to defend this act, which was not done with his consent or authority; the only excuse he ever alleged for having tolerated it was that otherwise in all likelihood the council would have been broken up. On December 4th the pope appointed a commission of three bishops to investigate the case against the heretic, and to procure witnesses; to the demand of Huss that he might be permitted to employ an agent in his defense a favorable answer was at first given, but afterward even this concession to the forms of justice was denied. While the commission was engaged in the prosecution of its inquiries, the flight of Pope John XXIII. took place on March 20th, an event which furnished a pretext for the removal of Huss from the Dominican convent to a more secure and more severe place of confinement under the charge of the bishop of Constance, at Gottlieben on the the Rhine. On May 4th the temper of the council on the doctrinal questions in dispute was for the first time fully revealed in its unanimous condemnation of Wickliffe, especially of the so-called "forty-five articles" as erroneous, heretical, revolutionary. It was not, however, until June 5th that the case of Huss himself came up for hearing; the meeting, which was an exceptionally full one, took place in the refectory of the Franciscan cloister. Autograph copies of his work *De Ecclesia*, and of the controversial tracts which he had written against Paletz and Stanislaus of Znaim, having been laid before him and duly acknowledged, the extracted propositions on which the prosecution based their charge of heresy were read; but as soon as the accused began to analyze them and to enter upon his defense, he was assailed by violent outcries, amid which it was impossible for him to be heard, so that he was compelled to bring his speech to an abrupt close, which he did with the calm remark; "In such a council as this I had expected more propriety, piety, and order." It was found necessary to adjourn the sitting until June 7th, on which occasion the outward decencies were better observed, partly no doubt from the circumstance that the emperor was present in person. The propositions which had been extracted from the *De Ecclesia* were again brought up, and the relations between Wickliffe and Huss were discussed, the object of the prosecution being to fasten upon the latter the charge of having entirely adopted the doctrinal system of the former, including especially a denial of the doctrine of transubstantiation. The accused defended himself by repudiating the charge of having abandoned the Catholic doctrine, while at the same time he gave expression to his hearty admiration and respect for the memory of Wickliffe. Being next asked to make an unqualified submission to the council, he expressed himself as unable to do so, while at the same time stating his willingness in all humility to amend his teaching wherever it had been shown to be false. With this the proceedings of the day were brought to a close. On June 8th the propositions extracted from the *De Ecclesia* were once more taken up with some fullness of detail; some of these he repudiated as incorrectly given, others he defended; but when asked to make a general recantation he steadfastly declined on the ground that to do so would be a dishonest admission of previous guilt. Among the propositions he could heartily abjure was that relating to transubstantiation; among those he felt constrained unflinchingly to maintain was one which had given great offense, to the effect that Christ, not Peter, is the head of the church to whom ultimate appeal must be made. The council, however, showed itself inaccessible to all his arguments and explanations, and its final resolution, as announced by D'Ailly, was threefold:—first, that Huss should humbly declare that he had erred in all the articles cited against him; secondly, that he should promise on oath neither to hold nor teach them in the future; thirdly, that he should publicly recant them. On his declining to make this submission he was removed from the bar, and it was obvious that the end could not be far off. The emperor himself gave it as his opinion that it had been clearly proved by many witnesses that the accused had taught many pernicious heresies, and that even should he recant he ought never to be allowed to preach or teach again or to return to Bohemia, but that should he refuse recantation there was no remedy but the stake. During the next four weeks no effort was spared to shake the determination of Huss; but the spirit of the martyr rose within him as he saw his end approaching, and he steadfastly refused to swerve from the path which conscience had once made clear. "I write this," says he, in a letter to his friends at Prague, "in prison and in chains, expecting to-morrow to receive sentence of death, full of hope in God that I shall not swerve from the truth, nor abjure errors imputed to me by false witnesses." The sentence he expected was pronounced on July 6th in the presence of the emperor and a full sitting of the council; once and again he attempted to remonstrate, but in vain, and finally he betook himself to silent prayer. After he had undergone the ceremony of degradation with all the childish formalities which are usual on such occasions, his soul was formally consigned by all those present to the devil, while he himself with clasped hands and uplifted eyes reverently committed it to Christ. He was then handed over to the secular arm, and immediately led off to the place of execution, the council meanwhile proceeding unconcernedly with the rest of its business for the day. Many touching incidents recorded in the histories make manifest the meekness, fortitude, and even cheerfulness with which he went to his dreadful death. After he had been tied to the stake and the fagots had been piled, he was for the last time urged to recant, but his only reply was:—"God is my witness that I have never taught or preached that which false witnesses have testified against me. He knows that the great object of all my preaching and writing was to convert men from sin. In the truth of that gospel which hitherto I have written, taught, and preached, I now joyfully die." The fire was then kindled, and his voice as it audibly prayed in the words of the "Kyrie Eleison" was soon stifled in the smoke. When the flames had done their office, the ashes that were left and even the soil on which they lay were carefully removed and thrown into the Rhine.

Not many words are needed to convey a tolerably adequate estimate of the character and work of the "pale, thin man in mean attire," who in sickness and poverty thus completed the forty-sixth year of a busy life at the stake. Huss was much less remarkable for the amount of his mental endowments and acquirements than for the candor with which he formed his convictions, the tenacity with which he held them, the unselfish enthusiasm with which he spoke them. He cannot be said to have added a single new item to the intellectual wealth of the world, but his contribution to its moral capital was immense. It might not be easy to formulate very precisely the doctrines for which he died, and certainly some of them, as, for example, that regarding the church, were such as many Protestants even would regard as unguarded and difficult to harmonize with the maintenance of external church order; but his is undoubtedly the honor of having been the chief intermediary in handing on from Wickliffe to Luther the torch which kindled the Reformation, and of having been one of the bravest of the martyrs who have died in the cause of honesty and freedom, of progress and of growth toward the light.

HUSSITES. The arbitrary arrest and imprisonment of Huss at Constance in November, 1415, created a very painful impression among all classes in Moravia and Bohemia, and called forth angry remonstrances as soon as it was known. While the nobles resorted to diplomacy, the masses rioted and in many instances attacked the clergy. The excitement was immensely intensified by the tidings of his death, which was freely characterized as a judicial murder; several priests were put to death by the infuriated populace, who cherished the memory of Huss as that of a patriot and a saint; and the archbishop himself, after having been beset in his own palace, with difficulty saved his life by flight. Public feeling found its first organized expression in a diet which was hastily summoned to meet at Prague early in September; there a solemn protest, ultimately signed by 452 magnates and barons, was drawn up, in which the personal character of Huss as man, teacher, preacher, and author was warmly upheld, and the freedom of Bohemia and Moravia from error and heresy was as energetically asserted. Three days later the nobles who had signed this document formed themselves into a league, headed by two Bohemian barons and one from Moravia, by which they bound themselves to protect liberty of preaching on their estates, and to yield obedience to bishop or pope only in so far as might be in accordance with Scripture and the will of God. Matters of dispute were to be subjected to the arbitration of the rector and doctors in theology of the university of Prague. Soon afterward a counter league was formed for the support of the council and curia; and civil war appeared to be imminent. The tension was further increased by the arrival of the bishop of Leitomischl, long the enemy of Huss, as legate from the council for the extirpation of heresy; and by the pressure of the interdict under which the city of Prague continued to lie. In February, 1416, the 452 nobles who had signed the protest in favor of Huss were summoned to appear before the council, while the anti-Hussite league was encouraged to prepare for a crusade; and the burning of Jerome of Prague in the following May still further revealed the prevailing disposition of Catholic Christendom. Owing to the slowness, however, with which matters moved at Constance, it was not until February, 1418, that the new pope, Martin V. (Otto di Colonna), was able to issue various bulls and briefs, in which he laid all obstinate Hussites under the ban, and called upon all the ecclesiastical and civil authorities to proceed against them. The council also, shortly before its dissolution, drew up twenty-four articles for withdrawing the Bohemians from the prevailing heresy, bidding King Wenceslaus protect the rights of the Romish Church in his dominion, restore the banished clergy to their benefices, repress the Hussite preaching and hymn-singing, dissolve the Hussite associations, and take the ringleaders into custody. To this policy the king, after much vacillation, began to give effect early in 1419, and forthwith the more prominent Hussites withdrew from court; among these were Nicolaus of Pistna, an able statesman, and the famous John Zizka, a practiced soldier, who placed themselves at the head of the malcontents.

By the end of the year the war, though it is usually reckoned from 1420, may be said to have begun. It divides itself into two periods—the defensive, which lasted from 1420 to 1425, and the offensive, which began with Procopius' invasion of Germany, in 1427, and lasted until the commencement of negotiations with the council of Basel, in 1431. The struggle had not proceeded very far, however, before it became manifest that the Hussite party was itself sharply divided in views and aims. All were agreed in warm and tender reverence for the memory of Huss, the evangelical preacher and the faithful servant of Christ; equally unanimous were they in holding the distinctive doctrine of the supreme authority of Holy Scripture, and in urging the reformation of the church. But all were not prepared to go equally far in the amount of reform they proposed. While the more radical section rejected such doctrines as those of purgatory and of the mediation of saints, held that priests in mortal sin could validly administer no sacrament, disapproved of penances, images, relics, mass in a foreign tongue, maintained the right of the pious laity, even of women, to preach, and regarded every building as in itself at least suitable for acts of divine worship, the more moderate or conservative section formulated their much simpler programme in the famous four articles of Prague (July, 1420). These were: (1) free preaching of the word of God throughout the kingdom of Bohemia; (2) the administration of the eucharist to all believers not in mortal sin, under both species according to the institution of Christ; (3) deprivation of the clergy of the secular lordship they had assumed, and of the secular property they had acquired to their own injury and to the prejudice of the civil power; (4) prohibition and repression of all mortal sins and public scandals. The supporters of these articles, who were led by Baron Czenko of Wartenberg, and had in their number such men as Jakob von Mies, were strong in the town and university of Prague, and occasionally received the name of the Praguers, but ultimately came to be more generally known as Calixtines (from "calix") or Utraquists (from their claim to receive the communion "sub utraque specie"). The more radical party, from having taken up their headquarters at a stronghold which had been fortified by Žizka and called Mount Tabor, some sixty-five miles southward of Prague, received the name of Taborites. Whatever differences, however, may have separated the Hussites, all were united in offering resistance to the efforts made by Sigismund to crush them; and at Deutschbrod in 1422, at Aussig in 1426, and finally at Taus (August 14, 1431), they inflicted signal defeats on his troops. Negotiations begun in 1431 with the council of Basel reached a termination only in November, 1433, when the so-called "Compactata" or articles of agreement were signed by which the Calixtines were satisfied, communion under both species being granted to all who desired it, although the other concessions in the direction of the four articles of Prague were made in a somewhat illusory manner. The Taborites, or "Orphans" (as the followers of Zizka were sometimes called after his death in 1424), failed, however, to find in the Compactata all that they required, and they speedily took the field again in a campaign which terminated disastrously for them at Hrib near Böhmischbrod on May 30, 1434. In this battle both Procopius and his brother perished, and soon afterward the Taborites were compelled to surrender all the fortresses to which they had betaken themselves. Thenceforward they rapidly disappeared as a political party, although as a religious body they can be traced to about the middle of the century, when they gradually became merged in the so-called Moravians, or United Brethren of Bohemia. The Calixtines obtained from Sigismund in 1436 the formal recognition of the Compactata, which from that time had the force of law. Satisfied with this somewhat empty achievement (which, however, was jealously guarded against the hostile attack of Pius II. in 1462), they gradually subsided into an inert conformity, so as to be but little distinguished from the Catholics around them. At the time of the Reformation some returned to the Roman Church, while the rest attached themselves either to the Lutheran or to the Reformed creed, and Hussitism as a distinct form of Christian profession became extinct.

HUSUM, a town in the Prussian province of Schleswig-Holstein, situated in a fertile district about two and a half miles inland from the German Ocean, on the canalized Husumer Au, which forms its harbor and roadstead. Population, 6,267.

HUSZT, a market-town in the county of Máramaros, Hungary, is situated at the confluence of the Nagy-Ág with the Theiss, and about midway on the line of railway from Szatmár-Németi to Máramaros-Sziget.

HUTCHESON, Francis, an eminent writer on mental and moral philosophy, was born on August 8, 1694. His birthplace was probably the townland of Drumalig, in the parish of Saintfield and county of Down, Ireland. He died in 1746.

In 1729 Hutcheson was elected as the successor of his old master, Gerschom Carmichael, to the chair of moral philosophy in the university of Glasgow. It is curious that up to this time both his essays and letters had all been published anonymously, though their authorship appears to have been perfectly well known.

HUTCHINSON, John, a Puritan soldier, son of Sir Thomas Hutchinson, was born at Nottingham in September, 1616. After the Restoration he became member for the county of Nottingham, and he was included in the Act of Amnesty passed in favor of certain of the regicides. Subsequently, however, he was arrested upon suspicion of being concerned in a treasonable conspiracy; and after an imprisonment of ten months in the Tower of London, and of one month in Sandown Castle, Kent, he died September 11, 1664.

HUTCHINSON, John, the author of *Moses' Principia* and other works in which the so-called Hutchinsonian system is expounded, was born at Spennithorne, Yorkshire, in 1674. He died in 1737.

HUTCHINSON, Thomas, governor of the province of Massachusetts, son of a wealthy merchant of Boston, was born there September 9, 1711. The son, being unsuccessful in commerce, studied law, and adopted it as his profession. He was representative of Boston in the general court for ten years, and was three times chosen speaker. From 1749 to 1766 he was a counselor, in 1752 he was appointed judge of probate, from 1758 to 1771 he was lieutenant-governor, and in 1760 he became chief-justice. In 1748 he carried a measure to substitute gold and silver for the paper currency, which had depreciated one-eighth in value. During the Stamp Act riots of 1765 his house was sacked by the mob, and by his subsequent support of the general policy of the British Government he incurred increasing unpopularity. In 1767 he laid claim to a seat in the council on the ground of being lieutenant-governor, but on account of his political views his claims were set aside. On his appointment to the governorship of Massachusetts in 1769 he used every method to support the measures which the mother country sought to enforce against the colonists; and in December, 1773, on account of his refusal to permit the reshipment of teas on which a duty had been laid by the government, several of the inhabitants of Boston emptied the tea into the bay. In January, 1774, Hutchinson asked leave to resign his office, and in June he sailed to England, where he spent the remainder of his life. As the result of official inquiry into his conduct while governor of Massachusetts, he was rewarded with a pension. He died at Brompton in June, 1780.

HUTCHINSON, the capital of Reno county, Kan., is situated on the Arkansas river, forty-five miles northwest of Wichita. Its population in 1890 was only 8,682, but at the 1900 census it had increased to 9,379. The city has a taxable value of $3,600,000. It contains thirteen churches and nine public school buildings (with 2,700 school children). The bonded debt is $124,000. There are gas and water works, electric lights, and street railways, a stock yard, three packing-houses, a lard refinery and fifteen salt plants. It is the largest salt-producing center in the west.

HUTTEN, Ulrich von (1488–1523), is one of those men who, like Erasmus or Pirckheimer, form the bridge between Humanists and Reformers. He lived with both, sympathized with both, though he died before the Reformation had time to fully develop itself. His life may be divided into four parts:—his youth and cloister-life (1488–1504); his wanderings in pursuit of knowledge (1504–1515); his strife with Ulrich of Würtemburg (1515–1519); and his connection with the Reformation (1519–1523). He was born April 21, 1488, at the castle of Steckelberg, near Fulda, in Franconia. In 1509 the university of Greifswald welcomed him. Here too the friends who at first received him so kindly became his foes; the sensitive, ill-regulated youth, who took the liberties of genius, wearied his burgher patrons; they could not brook the poet's airs and vanity, and ill-timed assertions of his higher rank. Wherefore he left Greifswald, and as he went was robbed of clothes and books, his only baggage, by the servants of his late friends; in the dead of winter, half starved, frozen, penniless, he reached Rostock. Here again the Humanists, who were throughout full of charity and sympathy toward the luckless young scholar, received him gladly, and under their protection he wrote against his Greifswald patrons, thus beginning the long list of his satires and fierce attacks on personal or public foes. Rostock could not hold him long; he wandered on to Wittenberg and Leipsic, and thence to Vienna, where he hoped to catch the emperor Maximilian's favor by an elaborate national poem on the war with Venice. But neither Maximilian nor the university of Vienna would lift hand for him, and he passed into Italy, that Holy Land of Humanist enthusiasm, where, at Pavia, he sojourned throughout 1511 and part of 1512. In the latter year his studies were rudely interrupted by war; in the siege of Pavia by papal troops and Swiss, he was plundered by both sides, and escaped sick and penniless to Bologna; on his recovery he even took service as a private soldier in the emperor's army.

This dark period lasted no long time; in 1514 he was again in Germany, where, thanks to his poetic gifts and the friendship of Eitelwolf von Stein, he won the favor of the elector of Mainz, Archbishop Albert of Brandenburg. Here high dreams of a learned career rose on him; Mainz should be made the metropolis of a grand Humanist movement, the center of good style and literary form. This golden dream was scattered by the murder in 1515 of his cousin John of Hutten by Ulrich, duke of Würtemburg. This outrage changed the whole course of Hutten's life; satire, chief refuge of the weak, became his weapon; with one hand he took his part in the famous *Epistolæ Obscurorum Virorum*, and with the other launched sca hing letters, eloquent Ciceronian orations, or biting satires against the duke. Though the emperor was too lazy and indifferent to smite a great prince, he condescended to bestow on Hutten the inexpensive honor of a laureate crown in 1517; as the poet tells us with pleased pride, the wreath was woven by the hands of fair Constantia, Conrad Peutinger's daughter. As recognized poet laureate of Germany, Hutten, who had been to Italy, again attached himself to the electoral court at Mainz; and he was there when in 1518 his true friend Pirckheimer wrote, urging him to abandon the court and dedicate himself to letters. We have the poet's long reply, in an epistle on his "way of life," an amusing mixture of earnestness and vanity, self-satisfaction and satire; he tells his friend that his career is just begun, that he has had twelve years of wandering, and will now enjoy himself awhile in patriotic literary work; that he has by no means deserted the humaner studies, but carries with him a little library of standard books. Pirckheimer in his burgher life may have ease and even luxury; he, a knight of the empire, how can he condescend to obscurity? He must abide where he can shine. And so, dazzled by his dream of an intellectual reform, Hutten chose the path which presently led him to his ruin.

In 1519 he issued in one volume his attacks on Duke Ulrich, and then, drawing sword, took part in the private war which overthrew that prince; in this affair he became intimate with Franz von Sickingen, the champion of the knightly order (Ritterstand). Henceforth Hutten takes part in the Lutheran movement, while he becomes mixed up in the attempt of the "Ritterstand" to recover its position, and to assert itself as the militia of the empire against the independence of the German princes. It was soon after this time that he discovered at Fulda a copy of the manifesto of the emperor Henry IV. against Hildebrand, and published it with comments as an attack on the papal claims over Germany. He hoped thereby to interest the new emperor Charles V., and the higher orders in the empire, in behalf of German liberties; but the appeal failed. What Luther had achieved by speaking to cities and common folk in homely phrase, because he touched heart and conscience, that the far finer weapons of Hutten failed to effect, because he tried to touch the more cultivated sympathies and dormant patriotism of princes and bishops, nobles and knights. And so he at once gained an undying name in the republic of letters and ruined his own career. He showed that the artificial verse-making of the Humanists could be connected with the new outburst of genuine German poetry. The Minnesinger was gone; the new national singer, a Luther or a Hans Sachs, was heralded by the stirring lines of Hutten's pen. These form a distinct epoch in the history of German national literature; they have in them a splendid natural swing and ring, strong and patriotic, though unfortunately addressed to knight and landsknecht rather than to the German people.

The poet's high dream of a knightly national regeneration had a rude awakening. The attack on the papacy, and Luther's vast and sudden popularity, frightened Elector Albert, who dismissed Hutten from his court. Hoping for imperial favor, he betook himself to Charles V.; but that cold young prince, who cared little for Humanists, and was not a German, would have none of him. So he returned to his friends, and they rejoiced greatly to see him still alive; for Pope Leo X. had ordered him to be arrested and sent to Rome, and assassins dogged his steps. He now attached himself more closely to Franz von Sickingen and the knightly movement. This also came to a disastrous end in the capture of the Ebernberg, and Sickingen's death; the higher nobles had triumphed; the archbishops avenged themselves on Lutheranism as interpreted by the knightly order. With Sickingen Hutten also finally fell. He fled to Basel, where Erasmus refused to see the sick hero, both for fear of his loathsome diseases, and also because the beggared knight was sure to borrow money from him. A paper war consequently broke out between the two Humanists, which embittered Hutten's last days, and stained the memory of Erasmus. From Basel Ulrich dragged his limbs to Mulhausen; and when the vengeance of Erasmus drove him thence, he went to Zurich. There the large heart of Zwingli welcomed him; he helped him with money, and found him a quiet refuge with the pastor of the little isle of Ufnau on the Zurich Lake. There the frail and worn-out poet, writing swift satire to the end, fell a victim to his infirmities, and died (August 29, 1523), at the age of thirty-five. He left behind him some debts due to compassionate friends; he did not even own a single book, and all his goods amounted to the clothes on his back, a bundle of letters, and that valiant pen which had fought so many a sharp battle, and had won for the poor knight-errant a sure place in the annals of literature.

HUTTON, CHARLES, the youngest son of Henry and Eleanor Hutton, was born at Newcastle-on-Tyne, August 14, 1737. He died on January 27, 1823.

HUTTON, JAMES (1726–1797), one of the great founders of geological science, was born in Edinburgh on June 3, 1726. He studied for three years at Edinburgh, and completed his medical education by an attendance of nearly two years at the medical classes in Paris, returning by the Low Countries, and taking his degree of doctor of medicine at Leyden in 1749. At the end of that year he came back to England, only to find, however, that though he had qualified himself to practice as a medical man there seemed hardly any opening for him. In the summer of the ensuing year he definitely abandoned the idea of following out the medical profession, and, having inherited a small property in Berwickshire from his father, resolved to devote himself to agriculture. With the zeal and thoroughness characteristic of his disposition, he then went to Norfolk to learn the practical work of farming. Thereafter he extended his experience by a tour in Holland, Belgium, and the north of France. During these years he began to study the surface of the earth, looking into every pit, ditch, or river-bed that he saw, and gradually shaping in his mind the problem to which he afterward devoted his energies. In the summer of 1754 he established himself on his own farm in Berwickshire, where he resided for fourteen years, and where he introduced the most improved forms of husbandry. As the farm was brought into excellent order, and as its management, becoming more easy, grew less interesting, he was finally induced to let it, and establish himself for the rest of his life in Edinburgh. This took place about the year 1768.

From this period until his death in 1797 he lived unmarried with his three sisters. Surrounded by congenial literary and scientific friends, he devoted himself to those researches which have had so important an influence upon the progress of science. At that time geology in any proper sense of the term did not exist. Mineralogy, however, had made considerable progress. Hutton's taste for chemistry naturally led him into mineralogy. But he had conceived larger ideas than were entertained by the mineralogists of his day. He desired to trace back the origin of the various minerals and rocks, and thus to arrive at some clear understanding of the history of the earth. For many years he continued to ponder over the subject, making during that time many excursions to different parts of the country to obtain materials for his researches, or to test the hypotheses he had been led to form. At last, in the spring of the year 1785 he communicated his views to the recently established Royal Society of Edinburgh in a paper entitled *Theory of the Earth, or an Investigation of the Laws Observable in the Composition, Dissolution, and Restoration of Land upon the Globe.* In this remarkable work the doctrine is expounded that geology is not cosmogony, but must confine itself to the study of the materials of the earth; that everywhere evidence may be seen that the present rocks of the earth's surface have been formed out of the waste of older rocks; that these materials having been laid down under the sea were there consolidated under great pressure, and were subsequently disrupted and upheaved by the expansive power of subterranean heat; that during these convulsions veins and masses of molten rock were injected into the rents of the dislocated strata; that every portion of the upraised land, as soon as exposed to the atmosphere, is subject to decay; and that this decay must tend to advance until the whole of the land has been worn away and laid down on the sea-floor, whence future upheavals will once more raise the consolidated sediments into new land. In some of these broad and bold generalizations Hutton was anticipated by the Italian geologists; but to him belongs the credit of having first perceived their mutual relations, and combined them in a luminous, coherent theory everywhere based upon observation.

It was not merely the ground beneath us to which Hutton directed his attention. He had long studied the changes of the atmosphere. The same volume in which his *Theory of the Earth* appeared contained also a *Theory of Rain*, which was read to the Royal Society of Edinburgh in February, 1784. He contended that the amount of moisture which the air can retain in solution increases with augmentation of temperature, and therefore that on the mixture of two masses of air of different temperatures a portion of the moisture must be condensed and appear in visible form. He investigated the data available in his time regarding rainfall and climate in different regions of the globe, and came to the conclusion that the rainfall is everywhere regulated by the humidity of the air on the one hand, and the causes which promote mixtures of different aërial currents in the higher atmosphere on the other.

The vigor and versatility of his genius may be understood from the variety of works which, during his thirty years' residence in Edinburgh, he gave to the world. In the year 1792 he published a quarto volume entitled *Dissertations on different Subjects in Natural Philosophy*, in which he discussed the nature of matter, fluidity, cohesion, light, heat, and electricity. Some of these subjects were further illustrated by him in papers read before the Royal Society of Edinburgh. His closing years were devoted to the extension and republication of his *Theory of the Earth*, of which two volumes octavo appeared in 1795. A third volume, necessary to complete the work, was left by him in manuscript, and is referred to by his biographer Playfair, but seems to have disappeared. No sooner had this task been performed than he set to work to collect and systematize his numerous writings on husbandry, which he proposed to publish under the title of *Elements of Agriculture.* He had nearly completed this labor when an incurable disease brought his active career to a close on March 26, 1797.

HUY, in Flemish **HOEY**, a town of Belgium, at the head of an arrondissement in the province of Liége, situated in the most romantic portion of the Meuse valley near the confluence of the Hoyoux, on the railway between Liége and Nemur, and about twenty miles west of the former city. It lies on both banks of the river, and the two portions are united by a bridge about 400 feet long. Population, 13,403.

HUYGENS, CHRISTIAAN, mathematician, mechanician, astronomer, and physicist, was born at the Hague, April 14, 1629. From his father Christiaan received the rudiments of his education, which was continued at Leyden under Vinnius and Schooten, and completed in the juridical school of Breda. His mathematical bent, however, soon diverted him from his legal studies, and the perusal of some of his earliest theorems enabled Descartes to predict his future greatness. In 1649 he accompanied the mission of Henry, count of Nassau, to Denmark, and in 1651 entered the lists of science as an assailant of the unsound system of quadratures adopted by Gregory of St. Vincent. This first essay (*Exetasis quadraturæ circuli*, Leyden, 1651) was quickly succeeded by his *Theoremata de quadratura hyperboles, ellipsis, et circuli;* while, in a treatise entitled *De circuli magnitudine inventa*, he made, three years later, the closest approximation hitherto obtained to the ratio of the circumference to the diameter of a circle.

But another class of subjects was about to engage his attention. The improvement of the telescope was then justly regarded as a *sine qua non* for the advancement of astronomical knowledge. Owing, however, to the difficulties interposed by spherical and chromatic aberration, little progress had been made in that direction when, in 1655, Huygens, working with his brother Constantin, hit upon a new method of grinding and polishing lenses. The immediate results of the clearer definition obtained were the detection of a satellite to Saturn (the sixth in order of distance from its primary), and the resolution into their true form of the abnormal appendages to that planet. Each discovery in turn was, according to the prevailing custom, announced to the learned world under the veil of an anagram—removed, in the case of the first, by the publication, early in 1656, of the little tract *De Saturni luna observatio nova ;* but retained, as regards the second, until 1659, when in the *Systema Saturnium* the varying appearances of the so-called "triple planet" were clearly explained as the phases of a ring inclined at an angle of 20° to the ecliptic. His application of the pendulum to regulate the movement of clocks was another fruit of his astronomical labors, springing, as it did, from his experience of the need for an exact measure of time in observing the heavens. The invention dates from 1656; the *Horologium*, containing a description of the requisite mechanism, was published in the following year, and on June 16, 1657, Huygens presented his first "pendulum-clock" to the States-General.

His reputation now became cosmopolitan. As early as 1655 the university of Angers had distinguished him with an honorary degree of doctor of laws. In 1663, on the occasion of his second visit to England, he was elected a fellow of the Royal Society, and imparted to that body in January, 1669, a clear and concise statement of the laws governing the collision of elastic bodies. Although these conclusions were arrived at independently, and as it would seem, several years previous to their publication, they were in great measure anticipated by the communications on the same subject of Wallis and Wren, made respectively in November and December, 1668.

Huygens had before this time fixed his abode in France. In 1665 Colbert made to him on behalf of Louis XIV. an offer too tempting to be refused, and between the following year and 1681 his residence in the philosophic seclusion of the Bibliothèque du Roi was only interrupted by two short visits to his native country. His *magnum opus* dates from this period. The *Horologium Oscillatorium*, published with a dedication to his royal patron in 1673, contained original discoveries sufficient to have furnished materials for half a dozen striking disquisitions. His solution of the celebrated problem of the "center of oscillation" formed in itself an important event in the history of mechanics. Assuming as an axiom that the center of gravity of any number of interdependent bodies cannot rise higher than the point from which it fell, he arrived, by anticipating in the peculiar case the general principle of the conservation of *vis viva*, at correct although not strictly demonstrated conclusions. His treatment of the subject is especially noteworthy as being the first successful attempt to deal with the dynamics of a system. The determination of the true relation between the length of a pendulum and the time of its oscillation; the invention of the theory of evolutes; the discovery, hence ensuing, that the cycloid is its own evolute, and is strictly isochronous; the ingenious although practically inoperative idea of correcting the "circular error" of the pendulum by applying cycloidal checks to clocks—were all contained in this remarkable treatise. The theorems on the composition of forces in circular motion with which it concluded formed the true prelude to the *Principia*, and would alone suffice to establish the claim of Huygens to the highest rank among mechanical inventors.

In 1681 he finally severed his French connections, and returned to Holland. The harsher measures which about that time began to be adopted towards his co-religionists in France are usually assigned as the motive of this step. He now devoted himself during six years to the production of lenses of enormous focal distance, which, mounted on high poles, and connected with the eyepiece by means of a cord, formed what were called "aërial telescopes." Three of his object glasses, of respectively 123, 180 and 210 feet focal length, are still in the possession of the Royal Society. He also succeeded in constructing an almost perfect achromatic eyepiece, still known by his name. But his researches in physical optics constitute his chief title-deed to immortality. Although Hooke first proposed the wave theory of light, Huygens gave reality to the conception, establishing it on a foundation so sure that it has never since been shaken. His powerful scientific imagination enabled him to perceive that an undulation may be broken up into an indefinite number of parts, each of which is the origin of a partial wave, and that the aggregate effect of all these partial waves will reconstitute the primary wave at any stage of its progress. This resolution of the main undulation is the well-known "principle of Huygens," and by its means he was enabled to prove the fundamental laws of optics, and to assign the correct construction for the direction of the extraordinary ray in uniaxial crystals. These investigations, together with his discovery of the "wonderful phenomenon" of polarization, are recorded in his *Traité de la Lumière*, published at Leyden in 1690, but composed in 1678. In the appended treatise *Sur la Cause de la Pésanteur*, he rejected gravitation as a universal quality of matter, although admitting the Newtonian theory of the planetary revolutions. From his views on centrifugal force he deducted the oblate figure of the earth, estimating its compression, however, at little more than one-half its actual amount.

Huygens was never married. He died at the Hague, June 8, 1695, bequeathing his manuscripts to the university of Leyden, and his considerable property to the sons of his younger brother.

HUYGENS, SIR CONSTANTIJN OR CONSTANTIN, Dutch poet and diplomatist, was born at the Hague, September 4, 1596. Huygens edited his poems for the last time in 1672, and died in his ninety-first year, on March 28, 1687.

HUYSMANS. Four painters of this family matriculated in the Antwerp guild in the seventeenth century. Cornelis the elder, apprenticed in 1633, passed for a mastership in 1636, and remained obscure. Jacob, apprenticed to Frans Wouters in 1650, wandered to England toward the close of the reign of Charles II., and competed with Lely as a fashionable portrait painter. Jan Baptist Huysmans, born at Antwerp in 1654, matriculated in 1676-77, and died there in 1715-16. He was younger brother to Cornelis Huysmans the second, who was born at Antwerp in 1648, and educated by Gaspar de Wit and Jacob van Artois.

HUYSUM, JAN VAN, artist, was born at Amsterdam, in 1662, and died in his native city February 8, 1749.

HWEN T'SANG is the most eminent representative of a remarkable and valuable branch of Chinese literature, known during the last half-century, chiefly through the labors of Continental scholars.

Hwen T'sang was born in the district of Keu-Shi, near Honan-Fu, about 605, a period at which Buddhism appears to have had a powerful influence upon a large body of educated Chinese. In 664 Hwen T'sang died in a convent at Chang-ngan. Some things in the history of his last days, and in the indications of beatitude recorded, strongly recall the parallel history of the saints of the Roman calendar. But on the other hand we find the Chinese saint, on the approach of death, causing one of his disciples to frame a catalogue of his good works, of the books that he had translated or caused to be transcribed, of the sacred pictures executed at his cost, of the alms that he had given, of the living creatures that he had ransomed from death. "When Kia-shang had ended writing this list, the master ordered him to read it aloud. After hearing it the devotees clasped their hands, and showered their felicitations on him." Thus the "well-done, good and faithful," comes from the servant himself in self-applause.

HYACINTH, also called JACINTH, one of the most popular of garden flowers, "supreme among the flowers of spring." It is no new favorite, having been in cultivation prior to 1597, at which date Gerard records the existence of six varieties, which are not indicated as particularly rare or novel.

The original of the cultivated hyacinth, *Hyacinthus orientalis*, is by comparison an insignificant plant, bearing on a spike only a few small, narrow-lobed washy blue flowers. So great has been the improvement effected by the florists, and chiefly by the Dutch, that the modern hyacinth would scarcely be recognized as the descendant of the type above referred to, the spikes being long and dense, composed of a large number of flowers; the spikes produced by strong bulbs not unfrequently measure six or seven inches in length and from seven to nine inches in circumference, with the flowers closely set on from bottom to top. Of late years much improvement has been effected in the size of the individual flowers and the breadth of their recurving lobes, as well as in securing increased brilliancy and depth of color.

The first hyacinths were single-flowered, but toward the close of the seventeenth century double-flowered ones began to appear, and till a recent period these bulbs were the most esteemed. At the present time, however, the single-flowered sorts are in the ascendant, as they produce more regular and symmetrical spikes of blossom, the flowers being closely set and more or less horizontal in direction, while most of the double sorts have the bells distant and dependent, so that the spike is loose and by comparison ineffective. For pot culture, and for growth in water-glasses especially, the single-flowered sorts are greatly to be preferred. Few if any of the original kinds are now in cultivation, a succession of new and improved varieties having been raised, the demand for which is regulated in some respects by fashion. At the present day our nurserymen offer in their annual catalogues of select sorts between two and three hundred distinct varieties.

The earliest of all the hyacinths, and one which is very valuable for forcing into flower in winter, is called the white Roman hyacinth. It is small-flowered, but very sweet, and if potted in September or October, as soon as the bulbs can be procured after importation, may easily be had in blossom by Christmas, when white flowers are so much sought after. Of course this is done with the aid of a forcing-house, but a very high temperature is not required. The best soil for pot hyacinths is made up of two parts turfy loam, one part decayed leaf-mold and one part well-decomposed cow-dung, with sand enough to make it porous, and with sufficient drainage.

The name of hyacinth is applied to several other plants having bulbous roots. The Cape hyacinth is *Scilla corymbosa;* the grape hyacinth, *Muscari botryoides;* the tassel hyacinth, *Muscari comosum*, and the feathered hyacinth, *Muscari comosum monstrosum;* the starch hyacinth, *Muscari racemosum;* the star hyacinth, *Scilla amœna;* the lily hyacinth, *Scilla Liliohyacinthus;* the hyacinth of Peru, *Scilla peruviana;* the wild hyacinth or blue-bell, *Hyacinthus non scriptus;* the wild hyacinth of America, *Camassia esculenta;* the Missouri hyacinth, *Hesperoscordum lacteum;* and the native hyacinth of Tasmania, *Thelymitra media.*

HYACINTHUS, a mythological figure connected with the Hyacinthia, a festival celebrated by the Spartans in honor of Apollo of Amyclæ, whose primitive image, standing on a throne, is described by Pausanias. The sister of Hyacinthus is Polybœa, the much nourishing fertility of the rich Amyclæan valley; while his brother is Cynortas, the rising of the dog (the hot) star. But with the death of the spring is united the idea of its certain resuscitation in a new year; like Dionysus, the hero is not merely dead, but elevated to heaven. The festival took place on the three hottest days of summer, 7th to 10th of the month Hecatombeus (which was called, in Sicily, Hyacinthius), and its rites were a mixture of mourning and rejoicing.

HYADES, five stars forming the head of the larger constellation, the Bull. Their rising along with the sun marks the opening of the rainy season, hence their name Hyades—the Rainy.

HYÆNA (*Hyænidæ*), a family of digitigrade carnivorous mammals, approaching the *Felidæ* or cats in the character of the dentition, while resembling the *Viverridæ* or civets in the possession of a glandular pouch beneath the anus, and therefore usually classed as a transition group between these two families. It comprises a single genus (*Hyæna*), and three species, which resemble each other and differ from all other carnivores in having both pairs of feet with four toes each. They are further characterized by the greater length of their fore legs as compared with those behind, by their well-developed although non-retractile claws, by their prickly, cat-like tongue, and by the enormous strength of their jaws and teeth, which enables them to break open the hardest bones, and to retain what they have seized with the most unrelaxing grip.

The Striped Hyæna (*Hyæna striata*) is the most widely distributed and best known form, being found throughout India, Persia, Asia Minor, and the northern half of Africa, while, if the strand wolf (*Hyæna villosa*) of the Cape colonists is only a variety of this species, as many naturalists suppose, its range will be thereby extended to the southern extremity of the African continent. It resembles a wolf in size, and is of a grayish-brown color, marked with indistinct longitudinal stripes of a darker hue, while the legs are transversely striped as in the zebra. The hairs on its body are long, especially on the ridge of the neck and back, where they form a distinct mane, which is continued along the tail. The hyæna is nocturnal in its habits, preferring by day the gloom of caves and ruins, or of the burrows which it occasionally forms, but coming forth at sunset to make night hideous with its unearthly howling, which, when the animal is excited, changes into what has been compared to demoniac laughter, and hence the name of "laughing hyæna," by which it is also known. The food of those creatures consists chiefly of carrion, and they thus perform a highly useful service in hot countries by devouring the remains of dead animals which might otherwise pollute the air. So ravenous, however, are they that even the bodies of the buried dead are not safe from their attacks, their powerful claws enabling them to gain access to the newly interred bodies in the Eastern cemeteries, which they are said habitually to frequent. They also feed on the flesh of animals, which they hunt in packs. When driven by hunger they have thus been frequently known to enter villages by night and to carry off such domestic animals as they might chance to find. Bruce, the African traveler, states that everywhere in Abyssinia they were a plague. "Gondar," he says, "was full of them from the time it turned dark till the dawn. In short, the hyæna was the plague of our lives, the terror of our night walks, the destruction of our mules and asses, which above all others are his favorite food." Although, in proportion to its size, possessing probably the most powerful teeth and jaws in the whole mammalian series, the pusillanimity of the hyæna is such as to prevent its attacking animals greatly inferior to itself in strength. The Arab, for this reason, holds it in contempt; and, when he condescends to hunt the hyæna, he does not waste his ammunition upon it, but runs it down with dogs. It has usually been regarded as untamable; this, however, is not the case, for when properly treated in captivity, it has been known to exhibit the greatest docility and attachment to its keepers; and Colonel Sykes states that in certain districts of central India where those creatures abound they are as susceptible of domestication as ordinary dogs.

The Spotted Hyæna (*Hyæna crocuta*) takes the place of the striped species in the southern half of the African continent, to which it is confined. It resembles the other in size, but differs from it considerably in appearance, the stripes of the one being replaced by dark brown spots on a yellowish ground in the other, while in the "tiger-wolf," as this species is called at the Cape, the mane is much less distinct. According to Schweinfurth, who met with it in the heart of Africa, it is a much more powerful and savage animal than the northern form. Although averse to hunting living prey, it takes to the chase when carrion is not to be had, and the same traveler was on one occasion startled by a spotted hyæna which darted past him, like lightning, in pursuit of an antelope. At the Cape it was formerly very common, and occasionally committed great havoc among the cattle, while it did not hesitate to enter the Kaffre dwellings at night and carry off the child sleeping by its mother's side. By persistent trapping and shooting, its numbers have now been considerably reduced, with the result, however, of making it, like the hippopotamus of the same regions, exceedingly wary, so that it is not readily caught in any trap with which it has had an opportunity of becoming acquainted. Like the northern species, the spotted hyæna has been tamed, and has occasionally been trained to take the place of the dog. Its skin exhibits a considerable variety of color and marking, and Schweinfurth found many skins in use among the Niamniams of Central Africa, in the form of aprons. The brown hyæna (*Hyæna rufa*) is also a native of South Africa.

Although hyænas are now confined to the warmer regions of the Old World, their fossil remains show that they had a much more northerly range during Tertiary times. Abundant remains of a larger species than any now living have been found in the caves of England, France, and Germany. This species, known as the cave hyæna (*Hyæna spelæa*), is supposed to have been most nearly allied to the spotted hyæna of South Africa, but does not appear to have extended farther south than the middle of Europe. Remains which have been doubtfully identified as belonging to the striped species have also been found in the south of France, and others in Sicily and Algeria, undoubtedly belonging to the spotted form of South Africa, which must thus have had a much more northerly extension in Tertiary times. No remains of the hyæna are known to occur in the New World.

HYBLA is the name of several cities in Sicily. A Sicilian goddess was named Hyblæa; hence doubtless the name was so common. The Hybla of which we hear most was founded by the Megarians, about the year 726 B.C., and is probably the same as Megara Hyblæa. For some time it was a flourishing city; a century after its foundation it founded in its turn the colony of Selinus. But about the year 481 B.C. it was completely destroyed by Gelon, tyrant of Syracuse. The mass of the inhabitants were sold as slaves; the richer were transported to Syracuse and there admitted as citizens.

HYBRIDISM. The Latin word *hybrida*, or *hibrida*, a hybrid or mongrel, is commonly derived from the Greek ὕβρις, an insult or outrage, with special reference to lust; hence an outrage on nature, a mongrel.

As a general rule animals or plants belonging to distinct species are not able, when crossed with each other, to produce offspring. There are, however, innumerable exceptions to this rule; and hybridism is the word employed to denote these exceptions. It is an abstract term which signifies the more or less fertile crossing of distinct species. In scientific usage, the term "hybrid" is exclusively reserved to denote the result of a fertile cross between two distinct species, while the term "mongrel" is the one which is as exclusively reserved to denote the result of a fertile cross between two varieties of the same species.

Until recently the interest attaching to hybridism was almost entirely of a practical nature, and arose from the fact, which is of considerable importance in horticulture, that hybrids are often found to present characters somewhat different from those of either parent species. But of late years the subject has acquired a high degree of scientific interest in relation to the theory of descent. On this account it has been so carefully and thoroughly treated by Mr. Darwin that a brief exposition of its main facts and principles must necessarily be little more than a condensation of his already closely packed material.

Looking first to the general facts and principles of hybridism, apart from their bearing upon the theory of descent, the following may be regarded as the most important:—

1. The laws governing the production of hybrids are identical, or nearly identical, in the animal and vegetable kingdoms.

2. The sterility which so generally attends the crossing of two specific forms is to be distinguished as of two kinds, which, although often confounded by naturalists, are in reality quite distinct. For the steril-

ity may obtain between the two parent species when first crossed, or it may first assert itself in their hybrid progeny. In the latter case the hybrids, although possibly produced without any appearance of infertility on the part of their parent species, nevertheless prove more or less infertile among themselves, and also with members of either parent species.

3. The degree of both kinds of infertility varies in the case of different species, and in that of their hybrid progeny, from absolute sterility up to complete fertility. Thus, to take the case of plants, "when pollen from a plant of one family is placed on the stigma of a plant of a distinct family, it exerts no more influence than so much inorganic dust. From this absolute zero of fertility, the pollen of different species, applied to the stigma of some one species of the same genus, yields a perfect gradation in the number of seeds produced, up to nearly complete, or even quite complete, fertility; so, in hybrids themselves, there are some which never have produced, and probably never would produce, even with the pollen of the pure parents, a single fertile seed; but in some of these cases a first trace of fertility may be detected, by the pollen of one of the pure parent species causing the flower of the hybrid to wither earlier than it otherwise would have done; and the early withering of the flower is well known to be a sign of incipient fertilization. From this extreme degree of sterility we have self-fertilized hybrids producing a greater and greater number of seeds up to perfect fertility."

4. Although there is, as a rule, a certain parallelism, there is no fixed relation between the degree of sterility manifested by the parent species when crossed and that which is manifested by their hybrid progeny. There are many cases in which two pure species can be crossed with unusual facility, while the resulting hybrids are remarkably sterile; and, contrariwise, there are species which can only be crossed with extreme difficulty, though the hybrids, when produced, are very fertile. Even within the limits of the same genus, these two opposite cases may occur.

5. When two species are reciprocally crossed, *i.e.*, male A with female B, and male B with female A, the degree of sterility often differs greatly in the two cases. The sterility of the resulting hybrids may differ likewise.

6. The degree of sterility of first crosses and of hybrids runs to a certain extent, parallel with the systematic affinity of the forms which are united. "For species belonging to distinct genera can rarely, and those belonging to distinct families can never, be crossed. The parallelism, however, is far from complete; for a multitude of closely allied species will not unite, or unite with extreme difficulty, while other species, widely different from each other, can be crossed with perfect facility. Nor does the difficulty depend on ordinary constitutional differences; for annual and perennial plants, deciduous and evergreen trees, plants flowering at different seasons, inhabiting different stations, and naturally living under the most opposite climates, can often be crossed with ease. The difficulty or facility apparently depends exclusively on the sexual constitution of the species which are crossed, or on their sexual elective affinity."

Such being the principal facts of hybridism, we may next consider the relation which they bear to the theory of descent. It is obvious that the most important point of contact between the former and the latter consists in this—that, although hybridism is occasionally possible as an exception to the general infertility of species *inter se*, it is only, as it were, a partial exception; for, even when produced, the hybrid progeny almost invariably manifest some greater or less degree of sterility, and this not only when crossed among themselves, but even when crossed with either of their parent species. The main facts of hybridism thus at first sight seem to support the time-honored doctrine that there are placed between all species the barriers of mutual sterility, for the purpose of preventing any admixture of specific qualities by heredity, and so for the purpose of maintaining the immutability of specific types. And the apparent support which this doctrine thus receives from the main facts of hybridism is still further strengthened when these facts are contrasted with those which are supplied by the breeding of our domestic "varieties." For, in the latter case, and as an almost invariable rule, neither the organisms when crossed nor their resulting progeny show any indications of sterility, although the two parent varieties may differ from one another even more widely than do many natural species which are wholly infertile when crossed. This very general distinction between natural species and domestic varieties has appeared to many competent persons in the present generation so profound and significant that they deem it to be in itself sufficient to discredit, if not to negative, the whole theory of the transmutation of species.

Now, when this distinction is thus posited as an objection to the theory of descent, we must first of all remember that this theory does not require the possibility of the commingling of specific types; it requires, indeed, that specific types should not be immutably fixed, but it does not require that the causes of their mutation should depend upon their mutual crossing. The whole difficulty, therefore, which the theory of descent has here to meet is to explain why it is that natural species are fenced about, as it were, with the mysterious barriers of sterility, while no such seeming care appears to have been taken in the case of our own domestic breeds—even though in the latter case artificial selection by the breeders may have produced more visible difference between the two parent races than that which natural selection is supposed to have produced between two natural species.

In answer to this difficulty, the most important consideration to begin with is one that is very generally lost sight of. The consideration is that mutual sterility between organic forms has been constituted by naturalists the chief criterion of specific distinction, and therefore it is merely to argue in a circle to maintain that specific distinction is of some transcendental nature *because* it is so invariably associated with this mutual sterility. If it were not for the fact of their mutual sterility, this and that species would probably not have been classified as such; and therefore it is now scarcely to be considered a matter of any great significance that all species present more or less of the peculiarity in virtue of which they are recognized as species. Or, otherwise stated, on the supposition that species have had a derivative origin, whenever the modification of a specific type has proceeded sufficiently far to induce sterility with allied types, the modified type is, *for this reason*, classified as a distinct species; otherwise, upon the supposition, the species could scarcely have become separated out as a distinct type. The argument which points to such sterility as evidence against this supposition is, therefore, so far inconclusive.

The case, however, ought not in fairness to be stated quite so strongly as this; for mutual sterility, although the chief, is not the only criterion of specific distinction. In forming their classifications, naturalists endeavor as much as possible to have regard to organisms in the totality of their structures and functions. It may therefore still be maintained that, although the above consideration as to mutual sterility being selected as the chief criterion of specific distinction greatly mitigates the force of the argument that natural species differ from artificial breeds in being more or less sterile with one another, still this consideration does not altogether destroy that argument. For, on the one hand, it is not mutual sterility alone which is taken as a test of specific distinction; and, on the other hand, it generally so happens that the other qualities distinctive of any given species do not differ more widely from those which are distinctive of allied species than is the case with many of our domestic breeds. It therefore still remains a significant circumstance that, *along with* the differences distinctive of natural species, there almost invariably goes the protective attribute of mutual sterility; while the possibly greater differences distinctive of our domestic breeds are unaccompanied by any such protective attribute. But, again, this more refined objection can be met and satisfactorily excluded by the general consideration that "as species rarely or never become modified in one character, without being at the same time modified in many, and as systematic affinity includes all visible resemblances and dissimilarities, any difference in sexual constitution between two species would naturally stand in more or less close relation with their systematic position."

But we are not confined to this general consideration alone. There are several other general considerations which tend still further to mitigate the difficulty, and there are several particular facts which together prove that the alleged distinction between natural species and domestic varieties is one, not of kind, but of degree. We shall, therefore, next proceed to state these general considerations and particular facts.

Upon the theory of descent, mutual sterility between specific types is nothing more than the expression of some certain amount of modification having taken place in the reproductive system of a changing form, which up to that time, and but for the fact of this modification, would have been classified by naturalists as a mere variety. Now the causes which act upon the reproductive system, both of animals and plants, and whether in the direction of sterility or prolificness, are at present hopelessly obscure. We cannot, therefore, expect to distinguish the causes which in the case of any given species have determined sterility. Nor is it necessary, for the meeting of the present difficulty, that this should be done; it is enough for this purpose to show that the causes which thus act upon the reproductive system are much too indistinct to admit of any argument being raised upon them. And this it is most easy to show; for it is not too much to say that the reproductive system is, generally speaking, of all parts of an organism the most delicately susceptible to slight changes in the conditions of life. Mr. Darwin has adduced a vast array of facts on this head in his *Variation of Animals and Plants Under Domestication.* As a result of this delicacy, there arises an apparent capriciousness in the ways and degrees in which the reproductive system is affected by slight changes in the conditions of life, by too close interbreeding, by grafting, and by many other causes. Thus, for example, the influences of domestication produce more or less sterility in numberless species of wild animals and plants, while in other species—and this, as we shall presently see, is a matter of great importance in the present connection—such influences are favorable to fertility. Now if we suppose, as in consistency we must suppose, that throughout the course of evolution the reproductive system has always been characterized by a sensitiveness to slight changes similar to that which we now observe, and if we remember that, in any case where these slight changes were sufficient to cause mutual sterility between the modified descendants of a common progenitor, a distinction of species must necessarily have arisen, we shall cease to regard the present sterility of species *inter se* as anything more than what might be expected *a priori*, supposing the theory of descent with gradual modification to be true.

As evidence of the apparent capriciousness with which sterility may be manifested, owing to the slight and imperceptible causes on which it depends, special allusion must here be made to a highly remarkable and significant fact that has been brought to light by the direct experiments of Mr. Darwin. The following is his account of these experiments:—

"Several plants belonging to distinct orders present two forms, which exist in about equal numbers, and which differ in no respect except in their reproductive organs,—one form having a long pistil with short stamens, the other a short pistil with long stamens; both with differently-sized pollen grains. With trimorphic plants there are three forms likewise differing in the length of their pistils and stamens, in the size and color of the pollen grains, and in some other respects; and, as in each of the three forms there are two sets of stamens, there are altogether six sets of stamens and three kinds of pistils. These organs are so proportioned in length to each other that, in any two of the forms, half the stamens in each stand on a level with the stigma of the third form. Now I have shown, and the result has been confirmed by other observers, that in order to obtain full fertility with other plants, it is necessary that the stigma of the one form should be fertilized by pollen taken from the stamens of corresponding height in the other form. So that with dimorphic species two unions, which may be called legitimate, are fully fertile, and two which may be called illegitimate are more or less infertile. With trimorphic species six unions are legitimate or fully fertile, and twelve are illegitimate or more or less infertile. The infertility which may be observed in various dimorphic and trimorphic plants when they are illegitimately fertilized, that is, by pollen taken from stamens not corresponding in height with the pistil, differs much in degree up to absolute and utter sterility,—just in the same manner as occurs in crossing distinct species."

In this case we appear to have actual evidence of different stages of increasing sterility *in transitu*, and this even within the limits of the same natural species. And if even such evidence as this can be resisted, there still remains one very important fact, which directly affects the whole alleged distinction between the sterility of natural species and the fertility of domestic breeds. This fact is that plants belonging to several species of the genus *Passiflora* have been amply proved, not only to be completely fertile with plants belonging to other species, but even to be as completely infertile with plants belonging to their own. Thus fruit could not be obtained from *P. alata* and *P. racemosa* except by reciprocally fertilizing them with each other's pollen; and similar facts have been observed by several experimentalists with regard to four or five other specimens of this genus. The fullest details on the subject are those given by Mr. Scott in the *Journal of the Linnean Society*, vol. viii., p. 168. Plants belonging to three species of the genus, viz., *P. racemosa*, *cœrulea*, and *alata*, flowered for many years in Edinburgh, but, though repeatedly fertilized by Mr. Scott and others with their own pollen, never produced seed. But when mutually crossed in various ways they all produced seed.

These cases in the genus *Passiflora*, although so highly remarkable, are not wholly unique. There is not, indeed, any other case of a natural species, the members of which are only fertile with members of another species; but there are several cases of natural species, the members of which are self-impotent, though freely fertile either with other plants of the same species, or with plants of different though allied species. This may perhaps be regarded as a transitional stage between the ordinary condition of plants and the extraordinary condition that obtains among species of the genus *Passiflora.* It occurs in individual plants of certain species of *Lobelia* and *Verbascum,* and among several genera of orchids. The cases of the latter are particularly remarkable, inasmuch as Fritz Müller found from numerous experiments, not only that individual plants belonging to the several species were not fertilized by their own pollen, while freely so by pollen taken from distinct species, and even from distinct genera, but that the plant's own pollen was positively deleterious to its stigma, and acted as a poison to the destruction of the flower.

So much, then, for the facts which go to prove on what slight constitutional differences sterility may depend, and the consequent probability there is that it should generally be found to accompany a change of organization which is sufficiently great to be regarded by naturalists as a specific distinction. But the pleading must not end here. For there still remains to be adduced the fact, already mentioned as one of the general facts of hybridism, that "the degree of both kinds of fertility varies in the case of different species, and in that of their hybrid progeny from absolute sterility up to complete fertility." As a matter of fact, the distinction between natural species and domestic varieties, upon which the whole discussion has hitherto proceeded, is in itself untenable; the infertility of natural species when crossed, although without question the general rule, is nevertheless not the invariable rule. We need not point to the highly anomalous case of *Passiflora* recently mentioned in another connection, and probably to be explained as the result of cultivation; for we appear to have sufficient evidence without it. It is true that a great deal of negative evidence has been published upon this point by very competent experimentalists; but it seems impossible to resist the positive evidence of the Hon. and Rev. W. Herbert, whose distinguished success in hybridizing Mr. Darwin attributes to "great horticultural skill, and to his having hothouses at his command." Of his many results, which from being of a positive kind can scarcely be suspected of inaccuracy, it will be enough to quote the following:—"Every ovule in a pod of *Crinum capense* fertilized by *C. revolutum* produced a plant, which I never saw to occur in a case of its natural fecundation." Thus, as Mr. Darwin in alluding to this case remarks, "we have perfect, or even more than commonly perfect, fertility in a first cross between two distinct species."

So far, then, as one side of the question before us is concerned, or that relating to the mutual infertility of natural species, enough has been said to show that it presents no real difficulty to the theory of descent. Indeed, in view of all that has now been said, the difficulty, as Mr. Darwin has observed, is not so much to account for the sterility of natural species, as it is to account for the continued, or even increased, fertility of our domestic varieties. Turning, therefore, to this other side of the question, we have to remember that the very same sensitiveness of the reproductive system, which in some cases leads to infertility under a change in the conditions of life, in other cases leads to increased fertility under an apparently similar change in the conditions of life. Thus it is that domestication produces such apparently capricious results with regard to fertility—inducing all degrees of infertility in some wild species, while not at all impairing, or even increasing, fertility in others. Consequently, when the question is as to why our domestic varieties do not become sterile *inter se* when so many natural species have become so, the answer is that the mere fact of their domestication proves that their wild or parent stocks must have been some of those species whose reproductive systems were not highly sensitive to changes in their condition of life, and therefore species which "might be expected to produce varieties little liable to have their reproductive systems injuriously affected by the act of crossing with other varieties which had originated in a like manner." Thus, on the inherently necessary view that our domestic varieties have all proceeded from species which were not easily affected in the direction of sterility, we are not surprised that under variation their reproductive systems should continue to manifest a high degree of tolerance. To this must be added that domestication, if it does not produce sterility, seems well calculated to increase fertility. For if the causes inducing sterility (whatever they may be) are absent, ample and regular nutrition, combined with innumerable lesser benefits attending domestication, may well be supposed to favor fertility. And, as a matter of fact, according to Pallas, there is a great deal of evidence to indicate that prolonged domestication has a tendency to eliminate sterility; so that wild species which when first domesticated intercross with difficulty become in time able to intercross with facility. Such, for instance, appears to have been the case with the dog; for on the one hand all the domestic varieties of this animal are now freely fertile among themselves, and, on the other hand, there is independent evidence that these varieties have sprung from more than one natural species. Again, mention must not be omitted of the important fact that, although in the case of none of our varieties of domesticated animals is there any evidence of mutual sterility, yet among our varieties of domesticated plants a few cases have been observed of complete mutual sterility, which is in every way analogous to that which occurs between natural species. Thus, Gärtner observed this to be the case with certain varieties of maize and *Verbascum,* Kölreuter with one kind of tobacco, and other experimentalists with sundry varieties of gourd and melon. And here, let it be observed, we have the exact counterpart that evolutionists would desire to the experiments of Herbert above mentioned; for while he was able to break down the general distinction between natural species and domestic varieties on the side of proving perfect fertility between certain natural species, these experimentalists have broken down the distinction on the side of proving perfect sterility between certain of our domestic varieties. Therefore, we may conclude that this side of the question, or that as to the fertility of our domestic varieties, presents as harmless an aspect toward the theory of descent as we have already seen to be presented by the other side of the question, or that as to the sterility of natural species.

Finally, there are two complementary considerations to be adduced, which may now be stated together. One is that the general principles of hybridism, as briefly stated at the beginning of this article, are really far from indicative of having been instituted with any design of simply preventing species from intercrossing. For, upon the view that they were so instituted, scarcely any one of them admits of a rational explanation. Thus, upon this view, no reason can be assigned why the degree of sterility should be so extremely variable in different species, when it must be supposed equally important that all species should be kept distinct; nor can it be said why the degree of sterility should vary even among individuals of the same species. Neither can it be said why some species should cross with facility, and yet produce sterile hybrids, while other species cross with difficulty, and yet produce fertile hybrids. Why should species living in countries remote from one another, and therefore not able in a state of nature to come together, nevertheless prove as sterile *inter se* as species inhabiting the same country? Why, again, should there often be so great a difference in the result of a reciprocal cross between two species? Or why, indeed, should the production of hybrids have been permitted at all? As Mr. Darwin observes, "to grant to species the special power of producing hybrids, and then to stop their further propagation by different degrees of sterility, not strictly related to the facility of the first union between their parents, seems a strange arrangement."

The other and complementary consideration which has to be mentioned is, that on the counter supposition of all these general principles of hybridism being "simply incidental," or dependent on unknown differences in the reproductive systems of species—on this supposition we meet with sundry differences between wild species and domestic varieties, which are fully analogous to their difference of fertility, and which yet cannot reasonably be supposed to serve any transcendental purpose. Thus, again to quote Mr. Darwin:—

"Some allied species of trees cannot be grafted on each other—all varieties can be so grafted. Some allied animals are affected in a very different manner by the same poison, but with varieties no such case until recently was known, but now it has been proved that immunity from certain poisons stands in some cases in correlation with the color of the hair. The period of gestation generally differs much with distinct species, but with varieties until lately no such difference had been observed. The time required for the germination of seeds differs in an analogous manner, and I am not aware that any difference in this respect has as yet been detected with varieties. Here we have various physiological differences, and no doubt others could be added, between one species and another of the same genus, which do not occur, or occur with extreme rarity, in the case of varieties; and these differences are apparently wholly or in chief part incidental on other constitutional differences, just in the same manner as sterility of crossed species is incidental on differences confined to the sexual system. Why, then, should these latter differences, however serviceable they may indirectly be in keeping the inhabitants of the same country distinct, be thought of such paramount importance in comparison with other incidental and functional differences? No sufficient answer to this question can be given."

Upon the whole, therefore, it may be concluded that the difficulty which the facts of hybridism seem at first sight to raise against the theory of descent may be explained in harmony with the main requirements of that theory.

Animal Hybrids.—A few words may here be added with special reference to animal hybrids. As a general statement it may be said that hybrids, not only between specific but generic forms, are more easily produced in the case of animals than in that of plants. The hybrids, however, when produced are, as a general rule, more sterile. Indeed, it is doubtful whether there is any single instance of a perfectly fertile hybrid having emanated from a cross between two animal species. Mr. Darwin, however, says: "I have reason to believe that the hybrids from *Cervulus vaginalis* and *Reevesii*, and from *Phasianus colchicus* with *P. torquatus*, are perfectly fertile." Also M. Quatrefages states that the hybrid progeny of two moths (*Bombyx cynthia* and *B. arrindia*) showed themselves to be fertile *inter se* for eight generations. The hare and rabbit are said occasionally to breed together, and their offspring to be highly fertile when crossed with either parent species. Lastly, Mr. Darwin observes:—

"The hybrids from the common and Chinese geese (*A. cygnoides*), species which are so different that they have sometimes been ranked in distinct genera, have often bred in this country with either pure parent, and in several instances *inter se*. This was effected by Mr. Eyton, who raised two hybrids from the same parents, but from different hatches; and from these two birds he raised no less than eight hybrids (grandchildren of the pure geese) from one nest. In India, however, these cross-bred geese must be far more fertile; for I am assured by two eminently capable judges, namely, Mr. Blyth and Captain Hutton, that whole flocks of these crossed geese are kept in various parts of the country; and, as they are kept for profit where neither pure parent-species exists, they must certainly be highly or perfectly fertile."

It is somewhat remarkable that hitherto direct experiments on the hybridization of animals have been so few in number as compared with those on the hybridization of plants. This is the more to be regretted, because, as already observed, animals appear to display a somewhat greater aptitude for hybridizing than plants, and consequently furnish better material for ascertaining the furthest limits of systematic affinity within which a cross may prove fertile. But here direct experiments are wanting, and all we can say with certainty is that in animals, as in plants, no authentic instance is on record of progeny resulting from a union of two individuals separated from one another by more than a generic distinction.

Graft-Hybridism.—The only other subject of importance that falls under the present heading is that which has been appropriately called "graft-hybridism." It is well known that, when two varieties or allied species are grafted together, each retains its distinctive characteristics. But to this general, if not universal, rule there are on record several alleged exceptions, in which either the scion is said to have partaken of the qualities of the stock, the stock of the scion, or each to have affected the other. Supposing any of these influences to have been exerted, the resulting product would deserve to be called a graft-hybrid. It is clearly a matter of great interest to ascertain whether such formation of hybrids by grafting is really possible; for, if even one instance of such formation could be unequivocally proved, it would show that sexual and asexual reproduction are essentially identical.

The cases of alleged graft-hybridism are exceedingly few, considering the enormous number of grafts that are made every year by horticulturists, and have been so made for centuries. Of these cases the most celebrated are those of Adam's laburnum (*Cytisus Adami*) and the bizzarria orange. Adam's laburnum is now flourishing in numerous places throughout Europe, all the trees having been raised as cuttings from the original graft, which was made by inserting a bud of the purple laburnum into a stock of the yellow. M. Adam, who made the graft, has left on record that from it there sprang the existing hybrid. There can be no question as to the truly hybrid character of the latter—all the peculiarities of both parent species being often blended in the same raceme, flower, or even petal; but until the experiment shall have been successfully repeated, there must always remain a strong suspicion that, notwithstanding the assertion and doubtless the belief of M. Adam, the hybrid arose as a cross in the ordinary way of seminal reproduction. Similarly, the bizzarria orange, which is unquestionably a hybrid between the bitter orange and the citron,—since it presents the remarkable spectacle of these two different fruits blended into one,—is stated by the gardener who first succeeded in producing it to have arisen as a graft-hybrid; but here again a similar doubt, similarly due to the need of corroboration, attaches to the statement. And the same remark applies to the still more wonderful case of the so-called trifacial orange, which blends three distinct kinds of fruit in one, and which is said to have been produced by artificially splitting and uniting the seeds taken from the three distinct species, the fruits of which now occur blended in the triple hybrid.

The other instances of alleged graft-hybridism are too numerous to be here noticed in detail; they refer to jessamine, ash, hazel, vine, hyacinth, potato, beet, and rose. Of these the cases of the vine, beet, and rose are the strongest as evidence of graft-hybridization, from the fact that some of them were produced as the result of careful experiments made by very competent experimentalists. On the whole, the results of some of these experiments, although so few in number, must be regarded as making out a strong case in favor of the possibility of graft-hybridism. For it must always be remembered that in experiments of this kind, negative evidence, however great in amount, may be logically dissipated by a single positive result.

HYDE, a township of England in the parish of Stockport, Cheshire, is situated near the river Tame and the Peak Forest canal, and on the Midland, and the Manchester, Sheffield, and Lincolnshire Railways, seven and one-half miles east from Manchester and six northeast from Stockport.

HYDE, EDWARD, Earl of Clarendon. See CLARENDON.

HYDE, THOMAS, a distinguished Orientalist, was born at Billingsley, near Bridgnorth, in Shropshire, June 29, 1636. Under Charles II., James II. and William III., Hyde discharged the duties of Eastern interpreter to the court. Worn out by his unremitting labors, he resigned his librarianship in 1701, and died at Oxford, February 18, 1703. Hyde was an excellent classical scholar, and there was hardly an Eastern tongue accessible to foreigners with which his wide erudition had not made him familiar.

HYDE PARK, a post-town of Norfolk county, Mass., seven miles south of Boston. It has some manufactories of machinery, paper and woolen goods, but is largely peopled by persons doing business in Boston. Population (1900), 13,244.

HYDER ALI, or HAIDAR 'ALI, the Mohammedan soldier-adventurer who, followed by his son Tippoo, became the most formidable Asiatic rival the English have ever had in India, was the great-grandson of a fakir or wandering ascetic of Islam, who had found his way from the Punjab to Kulburga in the south, and the second son of the Arab wife of a naik or chief constable at Budikote, near Colar, in Mysore, and was born about the beginning of the eighteenth century. The elder brother who, like himself, was early turned out into the world to seek his own fortune, became a naik, and ultimately rose to command a brigade in the Mysore army, while Hyder, who never learned to read or write, passed the first forty-seven years of his life aimlessly in sport and sensuality, sometimes, however, acting as the agent of his brother, and meanwhile acquiring a useful familiarity with the tactics of the French when at the height of their reputation under Dupleix. He is said to have induced his brother to employ a Parsee to purchase artillery and small arms from the Bombay Government, and to enroll some thirty sailors of different European nations as gunners, and is thus credited with having been "the first Indian who formed a corps of sepoys armed with firelocks and bayonets, and who had a train of artillery served by Europeans." At the siege of Deonhully (1749) Hyder's services attracted the attention of Nunjeraj, the minister of the maharajah of Mysore, and he at once received an independent command; within the next twelve years his energy and ability had made him completely master of minister and maharajah alike, and in everything but in name he was ruler of the kingdom. In 1763 the conquest of Canara gave him possession of the treasures of Bednore, which he resolved to make the most splendid capital in India, under his own name, thenceforth changed from Hyder Naik into Hyder Ali Khan Bahadoor; and in 1765 he retrieved previous defeat at the hands of the Marhattas by the destruction of the Nairs or military caste of the Malabar coast, and the conquest of Calicut. Hyder Ali now began to occupy the serious attention of the Madras Government, which in 1766 entered into an agreement with the nizam to hold the district known as the Northern Circars from him, and to furnish him with troops to be used against the common foe. But hardly had this alliance been formed when a new and secret arrangement was come to between the two Indian powers, the result of which was that Colonel Smith's small force was met with a united army of 80,000 men and 100 guns. British dash and sepoy fidelity, however, prevailed, first in the battle of Changama (September 3, 1767), and again still more remarkably in that of Trinomalee, which lasted two days; and the nizam's own capital of Hyderabad was threatened by Colonel Peach's expedition sent from Bengal. On the loss of his recently made fleet and forts on the western coast, Hyder Ali now began to make overtures for peace; on the rejection of these, bringing all his resources and strategy into play, he forced Colonel Smith to raise the siege of Bangalore, and brought his army within five miles of Madras. The result was the treaty of April, 1769, providing for the mutual restitution of all conquests, and for mutual aid and alliance in defensive war; it was followed by a commercial treaty in 1770 with the authorities of Bombay. Under these arrangements Hyder Ali, when defeated by the Marhattas in 1772, claimed English assistance, but in vain; this breach of faith stung him to fury, and thenceforward he and his son did not cease to thirst for vengeance. His time came when in 1778 the English, on the declaration of war, resolved to drive the French out of India. The capture of Mahe on the coast of Malabar in 1779, followed by the annexation of lands belonging to a dependent of his own, gave him the needed pretext. Again master of all that the Marhattas had taken from him, and with empire extended to the Kistna, he now summoned the French to his assistance, and, descending through the Changama pass amid burning villages, reached Conjeveram, only forty-five miles from Madras, unopposed. Not till the smoke was seen from St. Thomas' Mount, where Sir Hector Munro commanded some 5,200 troops, was any movement made; then, however, the British general sought to effect a junction with a smaller body under Colonel Baillie recalled from Guntoor. The incapacity of these officers, notwithstanding the splendid courage of their men, resulted in the total loss of Baillie's force of 2,800 (September 10, 1780). Hastings, again appealed to, sent from Bengal Sir Eyre Coote, who, though repulsed at Chillumbrum, defeated Hyder thrice successively in the battles of Porto Novo, Polliloor, and Sholingur, while Tippoo was forced to raise the siege of Wandewash, and Vellore was provisioned. On the arrival of Lord Macartney as governor of Madras, the English fleet captured Negapatam, took Trincomalee from the Dutch, and forced Hyder Ali to confess that he could never ruin a power which had such command of the sea. He was directing his attention to the west coast, where he sought the assistance of the French fleet, when his death took place suddenly at Chittore in December, 1782.

HYDERABAD ("the Territory of the Nizám"), an extensive realm of Southern India. This territory, inclusive of the Hyderabad Assigned Districts, known as Berar, is 475 miles in length from southwest to northeast, and about the same distance in breadth. The area of Berar is 17,728 square miles. and of the Nizám's Territories 71,807 square miles—the total area being about 82,698 square miles; pop. (1901), 11,174,897.

HYDERABAD, the chief city and capital of the above state, is situated on the river Musí, and stands at a height of about 1,700 feet above sea-level. No census of the population has been taken, but it has been estimated at 200,000. The scenery around Hyderabad is wild and picturesque, the country being hilly and dotted with numerous granite peaks and isolated rocks. Approached from the west, the appearance of the city is very striking—the palace, the mosques, and the magnificent pile of buildings erected for the British residency towering above the outer wall. A large lake, a few miles south of Hyderabad, covering an area of 10,000 acres, supplies the town with water. The palace of the nizám, the mosques, and the British residency are the principal buildings. The palace has no pretensions to splendor, but is of considerable size. Hyderabad is a great Mohammedan stronghold, and contains several mosques.

HYDERABAD, or HAIDARBÁDÁ, a British district in the commissionership of Sind, India, with an area of 9,053 square miles. It is bounded north by Kairpur State, east by Thar and Párkar political superintendency, south by the same tract and the river Kori, and west by the river Indus and Karáchí district. The district is a vast alluvial plain, 216 miles long and 48 broad. Fertile along the course of the Indus, it degenerates toward the east into sandy wastes, sparsely populated and defying cultivation. The monotony is relieved by the fringe of forest which marks the course of the river, and by the avenues of trees that line the irrigation channels which branch eastward from this stream. The south of the district has a special feature in its large natural water-courses and basin-like shallows which retain the rains for a long time.

HYDERABAD, the chief town of the above district, had in 1901 a population of 323,675, and including the suburbs, of 446,291. In the last ten years the population has increased rapidly. The municipal area is about fifteen square miles. Upon the site of the present fort is supposed to have stood the ancient town of Neránkot, which, in the eighth century, submitted to Muhammad Kásim Sakífí. Its situation near the apex of the delta of the Indus had commended itself to invaders and conquerors of still earlier date. It is identified with Patala, a town which has been connected with a prehistoric Scythian migration into India, (*c.* 625 B.C.?) Alexander the Great founded or refounded a city called Patala in or near the same place, 325 B.C., and left in it a military settlement. The best archæological authorities regard the modern Hyderabad as the representative of this Patala of the Greeks.

HYDRA (the name is also found as Sidra, Nidra, Idero, etc., and the ancient form was Hydrea), an island of Greece, lying about four miles off the southeast coast of Argolis in the Peloponnesus, and forming along with the neighboring island of Dhoko the Bay of Hydra. The length of the main axis of the island, which runs from southwest to northeast, is about eleven miles, and the area is about twenty-one square miles; but it is little better than a rocky and treeless ridge with hardly a patch or two of arable soil. There was little exaggeration in the reply made by Antonios Kriezes to the queen of Greece: "The island produces prickly pears in abundance, splendid sea captains, and excellent prime ministers." The population in 1900 was under 9,000.

HYDRANGEA, a popular flower much in request for the decoration of conservatories during the late summer season.

There are upward of thirty species, found chiefly in Japan, in the mountains of India and in North America, and many of them are familiar in gardens. *H. Hortensia* is the most useful for decoration, as the head of flowers lasts long in a fresh state, and by the aid of forcing can be had for a considerable period for the ornamentation of the greenhouse and conservatory. Their natural flowering season is toward the end of the summer, but they may be had earlier by means of forcing. *H. japonica* is another fine conservatory plant with foliage and habit much resembling the last-named, but this has flat corymbs of flowers, the central ones small and perfect, and the outer ones only enlarged and neuter. This also produces pink or blue flowers under the influence of different soils.

HYDRAULICS. See HYDROMECHANICS.

HYDROCEPHALUS, a term in medicine applied to two different forms of disease of the brain, both of which are attended with the effusion of fluid into its cavities. They are named respectively *Acute* and *Chronic Hydrocephalus.* They have different pathological associations, and have no necessary connection with each other.

Acute Hydrocephalus is the term still largely employed to describe the disease now known to physicians as tubercular cerebral meningitis, that is, inflammation of the membranes of the brain produced by the presence of tubercle. This disease is most common in children under ten years of age, but is by no means limited to that period of life, and may affect adults. The scrofulous or tubercular constitution is an important factor in this malady, which is admitted to be one of strongly hereditary tendency; yet unquestionably there are many instances in which no such taint can be traced. In numerous cases it is manifestly connected with bad hygienic conditions, with insufficient or improper feeding, or with over-exercise of the mental powers, all of which will doubtless more readily exert their influence where an inherited liability exists, and the same may be said regarding its occasional occurrence as one of the after consequences of certain of the diseases of childhood, especially measles and hooping-cough.

Acute hydrocephalus is usually described as passing through certain stages; but it must be observed, as regards at least its earlier manifestations, that, so far from being well defined, they are often exceedingly vague, and render this disease in an especial manner liable to escape detection for a length of time, or to be confounded with others to which at its commencement it bears an acknowledged resemblance, such, for instance, as typhoid fever or gastro-intestinal derangements. Nevertheless, there are certain typical features characterizing the disease in each of its stages which it is important to describe, as in many instances these present themselves with greater or less distinctness.

The premonitory symptoms of acute hydrocephalus are mostly such as relate to the general nutrition. A falling off in flesh and failure of strength are often observed for a considerable time before the characteristic phenomena of the disease appear. The patient, if a child, becomes listless and easily fatigued, loses appetite, and is restless at night. There is headache after exertion, and the temper often undergoes a marked change, the child becoming unusually peevish and irritable. These symptoms may persist during many weeks; but on the other hand such premonitory indications may be entirely wanting, and the disease be developed to all appearance quite suddenly.

The onset is in most instances marked by the occurrence of vomiting, often severe, but sometimes only slight, and there is in general obstinate constipation. In not a few cases the first symptoms are convulsions, which, however, may in this early stage subside, and remain absent, or reappear at a later period. Headache is one of the most constant of the earlier symptoms, and is generally intense and accompanied with sharper paroxysms, which cause the patient to scream, with a peculiar and characteristic cry. There is great intolerance of light and sound, and general nervous sensitiveness. Fever is present to a greater or less extent, the temperature ranging from 100° to 103° Fahr.; yet the pulse is not quickened in proportion, being, on the contrary, rather slow, but exhibiting a tendency to irregularity, and liable to become rapid on slight exertion. The breathing, too, is somewhat irregular. Symptoms of this character, constituting the stage of excitement, continue for a period varying from one to two weeks, when they are succeeded by the stage of depression. There is now a marked change in the symptoms, which is apt to lead to the belief that a favorable turn has taken place. The patient becomes quieter and inclines to sleep, but it will be found, on careful watching, that this quietness is but a condition of apathy or partial stupor into which the child has sunk. The vomiting has now ceased, and there is less fever; the pulse is slower, and shows a still greater tendency to irregularity than before, while the breathing is of markedly unequal character, being rapid and shallow at one time, and long drawn out and sinking away at another. There is manifestly little suffering, although the peculiar cry may still be uttered, and the patient lies prostrate, occasionally rolling the head uneasily upon the pillow, or picking at the bedclothes or at his face with his fingers. He does not ask for food, but readily swallows what is offered. The countenance is pale, but is apt to flush up suddenly for a time. The eyes present important alterations, the pupils being dilated or unequal, and scarcely responding to light. There may be double vision, or partial or complete blindness. Squinting is common in this stage, and there may also be drooping of an eyelid, due to paralysis of the part, and one or more limbs may be likewise paralyzed.

To this succeeds the third or final stage, in which certain of the former symptoms recur, while others become intensified. There is generally a return of the fever, the temperature rising sometimes to a very high degree. The pulse becomes feeble, rapid, and exceedingly irregular, as is also the case with the breathing. Coma is profound, but yet the patient may still be got to swallow nourishment, though not so readily as before. Convulsions are apt to occur, while paralysis, more or less extensive, affects portions of the body or groups of muscles. The pupils are now widely dilated, and there is generally complete blindness and often deafness. In this condition the patient's strength undergoes rapid decline, and the body becomes markedly emaciated. Death takes place either suddenly, in a fit, or more gradually from exhaustion. Shortly before the fatal event, it is not uncommon for the patient, who, it may be for many days previously, lay in a state of profound stupor, to wake up, ask for food, and talk to those around. But the hopes which may thus be raised are quickly dispelled by the setting in of the symptoms of rapid sinking.

The duration of a case of acute hydrocephalus varies somewhat, but in general death takes place within three weeks from the onset of the symptoms. The disease may be said to be almost invariably fatal, yet it must be admitted that cases presenting all the principal symptoms of acute hydrocephalus do occasionally recover, though such instances are undoubtedly very rare. Indeed, the condition of the brain in this disease, as revealed on *post-mortem* examination, renders its fatal character in no way surprising. The peculiar formation called tubercle is found deposited in the membranes of the brain, more particularly at its base. The irritation set up as a consequence of this is accompanied with the effusion of fluid into the arachnoid and ventricles, which by its pressure tends to produce softening and destruction of the brain substance, and hence to abolish its functions. In many instances the brain is found to be reduced to a state of complete disorganization.

Besides this condition of the brain, there exists in most cases deposition of tubercle elsewhere, as in the lungs and abdominal glands, and this may have given evidence of its presence even before the head symptoms had appeared. This is especially the case in adults, in whom acute hydrocephalus is more apt to arise as a complication in the course of pulmonary or other disease of tubercular origin than in the manner in which it occurs in children as above described.

With respect to treatment, little can be stated of an encouraging nature. Still it must be observed that much may be done in the way of prevention of this disease, and, in its earlier stages, even in the way of cure. It is most important in families where the history indicates a tuberculous or scrofulous tendency, and particularly where acute hydrocephalus has already occurred, that every effort should be used to fortify the system and avoid the causes already alluded to as favoring the development of the disease during that period in which children are liable to suffer from it. With this view wholesome food, warm clothing, cleanliness, regularity, and the avoidance of over-exertion, physical and mental, are of the utmost consequence.

Although there is but little that can be done when the disease has set in, yet the timely use of remedies may mitigate and even occasionally remove the symptoms. The severe headache may often be relieved by the application of one or two leeches to the temples, and by the frequent use of cold water or ice applied to the head. The treatment by blistering the scalp and administering mercury, formerly so much practiced, is now acknowledged to be of no real efficacy; and on the whole the maintenance of the patient's strength by light nourishment and the use of sedatives to compose the nervous system are the measures most likely to be attended with success. The bromide, with which may be combined the iodide of potassium, is the medicinal agent of most value for this purpose. Should convulsions occur, they are best treated by chloral or chloroform.

Chronic Hydrocephalus is a different form of disease from that last described, both as regards its pathology and its effects. It consists in an effusion of fluid into the serous cavities (arachnoid and ventricles) of the brain, not preceded by tuberculous deposit or acute inflammation, but apparently depending on chronic inflammatory changes affecting the membranes, and is to be regarded as a kind of dropsy. The disease is frequently congenital, and its presence in the fœtus is apt to be a source of difficulty in parturition. It is, however, more commonly developed in the course of the first six months of life; but it occasionally arises in older children, or even in adults, as in the well-known instance of Dean Swift, who died from this disease.

Chronic hydrocephalus affects mostly children wh bear evidence of a scrofulous, rickety, or otherwise delicate constitution. The chief symptoms observed are the gradual increase in size of the upper part of the head out of all proportion to the face or the rest of the body. Occurring at an age when as yet the separate bones constituting the skull have not become welded, this enlargement may go on to a very considerable extent in all directions, but chiefly in the transverse and antero-posterior diameters, the spaces between the bones becoming more and more expanded, though ultimately, should the child survive, ossification takes place. In a well-marked case the deformity is very striking. The upper part of the forehead projects abnormally, and the orbital plates of the frontal bone being inclined forward give a downward direction to the eyes, which have also peculiar rolling movements. The face is small, and this, with the enlarged head, gives a remarkably aged expression to the child. There is generally defective development in other respects, the body being ill nourished, the bones thin, the hair scanty and fine, and the teeth carious or absent.

As illustrating the extent to which this disease may proceed, it may be mentioned that the average circumference of the adult head is about twenty-two inches, while in the child it is of course considerably less. In chronic hydrocephalus the head of an infant three months old has been known to measure twenty-nine inches; and in the well-known case of the man Cardinal, who died in Guy's Hospital, the head measured thirty-three inches. In the museum of the faculty of medicine in Paris there is a hydrocephalic skull measuring thirty-nine inches. In aggravated cases the head cannot be supported by the neck, and the patient has to keep in the recumbent posture. The expansibility of the skull prevents destructive pressure on the brain, yet this organ is materially affected by the presence of the fluid. The cerebral ventricles are widely distended, and the convolutions flattened, while occasionally the fluid escapes into the cavity of the cranium, which it fills, pressing down the brain to the base of the skull. As a consequence of such changes, the functions of the brain are interfered with, and in general the mental condition of the patient is impaired to a greater or less extent. The child is dull and listless, irritable, and sometimes imbecile. The special senses become affected as the disease advances, especially vision, and sight is often lost, as is also hearing. Toward the close paralysis is apt to occur. Hydrocephalic children rarely live long, generally dying from the malady in a few years, or succumbing to some of the disorders of childhood, which they are little able to resist. Nevertheless there have been many instances of persons with this disease reaching maturity, and even living to old age. It must also be borne in mind that there are grades of this affection, and that children may present many of the symptoms of it in a comparatively slight degree, and yet recover, the head ceasing to expand, and becoming firmly ossified.

Various methods of treatment have been employed in this disease, but the results are seldom satisfactory. Compression of the head by bandages, and the administration of mercury with the view of promoting absorption of the fluid, are now little resorted to. Tapping the fluid from time to time through one of the spaces between the bones, drawing off a little, and thereafter employing gentle pressure, has been tried, but seldom with permanent benefit. On the whole, the plan of treatment which aims at maintaining the patient's nutrition by appropriate food and tonics is at once the most rational and successful, provided it be resorted to in time to admit of the arrest of the progress of the symptoms.

HYDROGEN (from ὕδωρ, water, and γεννάω, to generate) is a chemical element which in the free state occurs in volcanic gases, but exists for the most part in combination with oxygen as water. As its elemental characteristics and the chief compounds of hydrogen, have already been described in the article CHEMISTRY, it is here only necessary to refer to the liquefaction of gaseous hydrogen.

At the close of 1877 and in the beginning of 1878, not only hydrogen, but all the so-called permanent gases, were reduced to the liquid state, an achievement the more remarkable as it was the result of the simultaneous but entirely independent labors of two distinguished physicists, M. Cailletet of Châtillon-sur-Seine and M. Pictet of Geneva.

HYDROMECHANICS. The word *Hydromechanics* is derived from the Greek ὑδρο-μηχανικά, meaning the mechanics of water and fluids in general. The science is divided into three branches:—*Hydrostatics*, which deals with the equilibrium of fluids; *Hydrodynamics*, which deals with the mathematical theory of the motion of fluids, neglecting the viscosity; and *Hydraulics*, in which the motion of water in pipes and canals is considered, and hydrodynamical questions of practical application are investigated. Of hydrodynamics we shall only speak incidentally here, as the subject is too purely technical to be understood, except by the use of mathematical demonstrations, too long to be included in a work of this scope.

The science of hydromechanics was cultivated with less success among the ancients than any other branch of mechanical philosophy. When the human mind had made considerable progress in the other departments of physical science, the doctrine of fluids had not begun to occupy the attention of philosophers; and, if we except a few propositions on the pressure and equilibrium of water, hydromechanics must be regarded as a modern science, which owes its existence and improvement to those great men who adorned the seventeenth and eighteenth centuries.

Those general principles of hydrostatics which are to this day employed as the foundation of that part of the science were first given by Archimedes about 250 B.C., and were afterward applied to experiments by Marinus Ghetaldus in his *Promotus Archimedes* (1603). Archimedes maintained that each particle of a fluid mass, when in equilibrium, is equally pressed in every direction; and he inquired into the conditions according to which a solid body floating in a fluid should assume and preserve a position of equilibrium. We are also indebted to him for that ingenious hydrostatic process by which the purity of the precious metals can be ascertained, and for the screw engine which goes by his name.

In the Greek school at Alexandria, which flourished under the auspices of the Ptolemies, the first attempts were made at the construction of hydraulic machinery. About 120 B.C. the fountain of compression, the siphon, and the forcing pump were invented by Ctesibius and Hero; and, though these machines operated by the pressure of the air, yet their inventors had no distinct notions of the preliminary branches of pneumatical science. The siphon is a simple instrument; but the forcing pump is a complicated and abstruse invention, which could scarcely have been expected in the infancy of hydraulics. It was probably suggested to Ctesibius by the *Egyptian Wheel* or *Noria*, which was common at that time, and which was a kind of chain pump, consisting of a number of earthen pots carried round by a wheel. In some of these machines the pots have a valve in the bottom which enables them to descend without much resistance, and diminishes greatly the load upon the wheel; and, if we suppose that this valve was introduced so early as the time of Ctesibius, it is not difficult to perceive how such a machine might have led that philosopher to the invention of the forcing pump.

Notwithstanding these inventions of the Alexandrian school, its attention does not seem to have been directed to the motion of fluids. The first attempt to investigate this subject was made by Sextus Julius Frontinus, inspector of the public fountains at Rome in the reigns of Nerva and Trajan; and we may justly suppose that his work, entitled *De Aquæductibus Urbis Romæ Commentarius*, contains all the hydraulic knowledge of the ancients. After describing the nine great Roman aqueducts, to which he himself added five more, and mentioning the dates of their erection, he considers the methods which were at that time employed for ascertaining the quantity of water discharged from ajutages, and the mode of distributing the waters of an aqueduct or a fountain. He justly remarks that the flow of water from an orifice depended not only on the magnitude of the orifice itself, but also on the height of the water in the reservoir; and that a pipe employed to carry off a portion of water from an aqueduct should, as circumstances required, have a position more or less inclined to the original direction of the current. But as he was unacquainted with the true law of the velocities of running water as depending upon the depth of the orifice, we can scarcely be surprised at the want of precision which appears in his results.

It has generally been supposed that the Romans were ignorant of the art of conducting and raising water by means of pipes; but it can scarcely be doubted, from the statement of Pliny and other authors, not only that they were acquainted with the hydrostatical principle, but that they actually used leaden pipes for the purpose. Pliny asserts that water will always rise to the height of its source, and he also adds that, in order to raise water up to an eminence, leaden pipes must be employed.

Castelli and Torricelli, two of the disciples of Galileo, applied the discoveries of their master to the science of hydrodynamics. In 1628 Castelli published a small work, *Della Misura dell' acque correnti*, in which he gave a very satisfactory explanation of several phenomena in the motion of fluids in rivers and canals. But he committed a great paralogism in supposing the velocity of the water proportional to the depth of the orifice below the surface of the vessel. Torricelli, observing that in a jet where the water rushed through a small ajutage it rose to nearly the same height with the reservoir from which it was supplied, imagined that it ought to move with the same velocity as if it had fallen through that height by the force of gravity. And hence he deduced this beautiful and important proposition, that the velocities of fluids are as the square root of the head, allowing for the resistance of the air and the friction of the orifice. This theorem was published in 1643, at the end of his treatise *De Motu gravium Projectorum*. It was afterward confirmed by the experiments of Raphael Magiotti on the quantities of water discharged from different ajutages under different pressures; and, though it is true only in small orifices, it gave a new turn to the science of hydraulics.

After the death of the celebrated Pascal, who discovered the pressure of the atmosphere, a treatise on the equilibrium of fluids was found among his manuscripts, and was given to the public in 1663. In the hands of Pascal hydrostatics assumed the dignity of a science. The laws of the equilibrium of fluids were demonstrated in the most perspicuous and simple manner, and amply confirmed by experiments. The discovery of Torricelli, it may be supposed, would have incited Pascal to the study of hydraulics. But, as he has not treated this subject in the work mentioned, it was probably composed before that discovery had been made public.

The theorem of Torricelli was employed by many succeeding writers, but particularly by the celebrated Mariotte, whose labors in this department of physics deserve to be recorded. His *Traité du Mouvement des Eaux*, which was published after his death in the year 1686, is founded on a great variety of well-conducted experiments on the motion of fluids, performed at Versailles and Chantilly. In the discussion of some points he has committed considerable mistakes. Others he has treated very superficially, and in none of his experiments does he seem to have attended to the diminution of efflux arising from the contraction of the fluid vein, when the orifice is merely a perforation in a thin plate; but he appears to have been the first who attempted to ascribe the discrepancy between theory and experiment to the retardation of the water's velocity arising from friction. His contemporary Guglielmini, who was inspector of the rivers and canals in the Milanese, had ascribed this diminution of velocity in rivers to transverse motions arising from inequalities in their bottom. But as Mariotte observed similar obstructions even in glass pipes, where no transverse currents could exist, the cause assigned by Guglielmini seemed destitute of foundation. The French philosopher, therefore, regarded these obstructions as the effects of friction. He supposes that the filaments of water which graze along the sides of the pipe lose a portion of their velocity; that the contiguous filaments, having on this account a greater velocity, rub upon the former, and suffer a diminution of their celerity; and that the other filaments are affected with similar retardations proportional to their distance from the axis of the pipe. In this way the medium velocity of the current may be diminished, and consequently the quantity of water discharged in a given time must, from the effects of friction, be considerably less than that which is computed from theory. Guglielmini was the first who attended to the motion of water in rivers and open canals (*La Misura dell' acque correnti*). Embracing the theorem of Torricelli, which had been confirmed by repeated experiments, Guglielmini concluded that each particle in the perpendicular section of a current has a tendency to move with the same velocity as if it issued from an orifice at the same depth from the surface. The consequences deducible from this theory of running waters are in every respect repugnant to experience, and it is really surprising that it should have been so hastily adopted by succeeding writers. Guglielmini himself was sufficiently sensible that his parabolic theory was contrary to fact, and endeavored to reconcile them by supposing the motion of rivers to be obstructed by transverse currents arising from irregularities in their bed. The solution of this difficulty, as given by Mariotte, was more satisfactory, and was afterward adopted by Guglielmini, who maintained also that the viscosity of water had a considerable share in retarding its motion.

The effects of friction and viscosity in diminishing the velocity of running water were noticed in the *Principia* of Sir Isaac Newton, who threw much light upon several branches of hydromechanics. At a time when the Cartesian system of vortices universally prevailed, this great man found it necessary to investigate that absurd hypothesis, and in the course of his investigations he showed that the velocity of any stratum of the vortex is an arithmetical mean between the velocities of the strata which inclose it; and from this it evidently follows that the velocity of a filament of water moving in a pipe is an arithmetical mean between the velocities of the filaments which surround it. Taking advantage of these results, it was afterward shown by Pitot that the retardations arising from friction are inversely as the diameters of the pipes in which the fluid moves. The attention of Newton was also directed to the discharge of water from orifices in the bottom of vessels. He supposed a cylindrical vessel full of water to be perforated in its bottom with a small hole by which the water escaped, and the vessel to be supplied with water in such a manner that it always remained full at the same height. He then supposed this cylindrical column of water to be divided into two parts—the first, which he calls the "cataract," being an hyperboloid generated by the revolution of an hyperbola of the fifth degree around the axis of the cylinder which should pass through the orifice, and the second the remainder of the water in the cylindrical vessel. He considered the horizontal strata of this hyperboloid as always in motion, while the remainder of the water was in a state of rest, and imagined that there was a kind of cataract in the middle of the fluid. When the results of this theory were compared with the quantity of water actually discharged, Newton concluded that the velocity with which the water issued from the orifice was equal to that which a falling body would receive by descending through half the height of water in the reservoir. This conclusion, however, is absolutely irreconcilable with the known fact that jets of water rise nearly to the same height as their reservoirs, and Newton seems to have been aware of this objection. In the second edition of his *Principia* accordingly, which appeared in 1714, he reconsidered his theory. He had discovered a contraction in the vein of fluid (*vena contracta*) which issued from the orifice, and found that, at the distance of about a diameter of the aperture, the section of the vein was contracted in the subduplicate ratio of two to one. He regarded, therefore, the section of the contracted vein as the true orifice from which the discharge of water ought to be deduced, and the velocity of the effluent water as due to the whole height of water in the reservoir; and by this means his theory became more conformable to the results of experience. This theory, however, is still liable to serious objections. The formation of a cataract is by no means agreeable to the laws of hydrostatics; for when a vessel is emptied by the efflux of water through an orifice in its bottom, all the particles of the fluid direct themselves toward this orifice, and therefore no part of it can be considered as in a state of repose.

The subject of the oscillation of waves, one of the most difficult in the science of hydrodynamics, was first investigated by Newton. In the forty-fourth proposition of the second book of his *Principia*, he has furnished us with a method of ascertaining the velocity of the waves of the sea, by observing the time in which they rise and fall. If the two vertical branches of a siphon, which communicate by means of a horizontal branch, are filled with a fluid of known density, the two fluid columns, when in a state of rest, will be in equilibrium and their surfaces horizontal. But if the one column is raised above the level of the other, and left to itself, it will descend below that level, and raise the other column above it, and, after a few oscillations, they will return to a state of repose. Newton occupied himself in determining the duration of these oscillations, or the length of a pendulum isochronous to their duration; and he found, by a simple process of reasoning, that, allowing for the effects of friction, the length of a synchronous pendulum is equal to one-half of the length of the siphon, that is, of the two vertical branches and the horizontal one, and hence he deduced the isochronism of these oscillations. From this Newton concluded that the velocity of waves formed on the surface of water, either by the wind or by a body thrown into it, was in the subduplicate ratio of their size. When their velocity, therefore, is measured, which can be easily done, the size of the waves will be determined by means of a pendulum, which oscillates in the time that a wave takes to rise and fall.

Such was the state of hydrodynamics in 1738, when Daniel Bernoulli published his *Hydrodynamica, sive de Viribus et Motibus Fluidorum Commentarii.* The germ of Daniel Bernoulli's theory was first published in his memoir entitled *Theoria Nova de Motu Aquarum per Canales quocunque fluentes*, which he had communicated to the Academy of St. Petersburg as early as 1726. His theory of the motion of fluids was founded on two suppositions, which appeared to him conformable to experience. He supposed that the surface of a fluid, contained in a vessel which is emptying itself by an orifice, remains always horizontal; and, if the fluid mass is conceived to be divided into an infinite number of horizontal strata of the same bulk, that these strata remain contiguous to each other, and that all their points descend vertically, with velocities inversely proportional to their breadth, or to the horizontal sections of the reservoir. In order to determine the motion of each stratum, he employed the principle of the *conservatio virium vivarum*, and obtained very elegant solutions. In the opinion of the Abbé Bossut, his work was one of the finest productions of mathematical genius. The uncertainty of the principle employed by Daniel Bernoulli, which has never been demonstrated in a general manner, deprived his results of that confidence which they would otherwise have deserved, and rendered it desirable to have a theory more certain, and depending solely on the fundamental laws of mechanics. Maclaurin and John Bernoulli, who were of this opinion, resolved the problem by more direct methods, the one in his *Fluxions*, published in 1742, and the other in his *Hydraulica nunc primum detecta, et demonstrata directe ex fundamentis pure mechanicis*, which forms the fourth volume of his works. The method employed by Maclaurin has been thought not sufficiently rigorous; and that of John Bernoulli is, in the opinion of Lagrange, defective in perspicuity and precision.

The theory of Daniel Bernoulli was opposed also by the celebrated D'Alembert. When generalizing James Bernoulli's theory of pendulums he discovered a principle of dynamics so simple and general that it reduced the laws of the motions of bodies to that of their equilibrium. He applied this principle to the motion of fluids, and gave a specimen of its application at the end of his *Dynamics* in 1743. It was more fully developed in his *Traité des Fluides*, which was published in 1744, where he has resolved, in the most simple and elegant manner, all the problems which relate to the equilibrium and motion of fluids. He makes use of the very same suppositions as Daniel Bernoulli, though his calculus is established in a very different manner. He considers, at every instant, the actual motion of a stratum as composed of a motion which it had in the preceding instant and of a motion which it has lost. The laws of equilibrium between the motions lost furnish him with equations which represent the motion of the fluid. Although the science of hydrodynamics had then made considerable progress, yet it was chiefly founded on hypothesis. It remained a desideratum to express by equations the motion of a particle of the fluid in any assigned direction. These equations were found by D'Alembert from two principles—that a rectangular canal, taken in a mass of fluid in equilibrium, is itself in equilibrium; and that a portion of the fluid, in passing from one place to another, preserves the same volume when the fluid is incompressible, or dilates itself according to a given law when the fluid is elastic. His very ingenious method was published in 1752, in his *Essai sur la Resistance des Fluides.* It was brought to perfection in his *Opuscules Mathématiques*, and was adopted by Euler.

Before the time of D'Alembert, it was the great object of philosophers to submit the motion of fluids to general formulæ, independent of all hypothesis. Their attempts, however, were altogether fruitless; for the method of fluxions, which produced such important changes in the physical sciences, was but a feeble auxiliary in the science of hydraulics. For the resolution of the questions concerning the motion of fluids, we are indebted to the method of partial differences, a new calculus, with which Euler enriched the sciences. This great discovery was first applied to the motion of water by D'Alembert, and enabled both him and Euler to represent the theory of fluids in formulæ restricted by no particular hypothesis.

The most successful laborer in the science of hydrodynamics was the Chevalier Dubuat, engineer in ordinary to the king of France. Following in the steps of the Abbé Bossut (*Nouvelles expériences sur la resistance des fluides*, 1777), he prosecuted the inquiries of that philosopher with uncommon ingenuity; and in the year 1786 he published, in two volumes, his *Principes d'Hydraulique*, which contains a satisfactory theory of the motion of fluids, founded solely upon experiments. Dubuat considered that if water were a perfect fluid, and the channels in which it flowed infinitely smooth, its motion would be continually accelerated, like that of bodies descending in an inclined plane. But as the motion of rivers is not continually accelerated, and soon arrives at a state of uniformity, it is evident that the viscosity of the water, and the friction of the channel in which it descends, must equal the accelerating force. Dubuat therefore assumes it as a proposition of fundamental importance that, when water flows in any channel or bed, the accelerating force which obliges it to move is equal to the sum of all the resistances which it meets with, whether they arise from its own viscosity or from the friction of its bed. This principle was employed by Dubuat in the first edition of his work, which appeared in 1779, but the theory contained in that edition was founded on the experiments of others. He soon saw, however, that a theory so new, and leading to results so different from the ordinary theory, should be founded on new experiments more direct than the former, and he was employed in the performance of these from 1780 to 1783. The experiments of Bossut having been made only on pipes of a moderate declivity, Dubuat found it necessary to supply this defect. He used declivities of every kind, and made his experiments upon channels from a line and a half in diameter to seven or eight square toises.

The theory of running water was greatly advanced by the researches of Prony. From a collection of the best experiments by Couplet, Bossut, and Dubuat he selected eighty-two (fifty-one on the velocity of water in conduit pipes, and thirty-one on its velocity in open canals); and, discussing these on physical and mechanical principles, he succeeded in drawing up general formulæ, which afford a simple expression for the velocity of running water.

Eytelwein of Berlin published, in 1801, a valuable compendium of Hydraulics, entitled *Handbuch der Mechanik und der Hydraulik*, which contains an account of many new and valuable experiments made by himself. He investigates the subject of the discharge of water by compound pipes, the motions of jets, and their impulses against plane and oblique surfaces; and he shows theoretically that a water wheel will have its effect a maximum when its circumference moves with half the velocity of the stream.

A series of interesting hydraulic experiments was made at Rome in 1809 by Mallet and Vici. They found that a pipe whose gauge was five ounces French measure furnished one-seventh more water than five pipes of one ounce, an effect arising from the velocity being diminished by friction in the ratio of the perimeters of the orifices as compared with their areas.

Hachette, in the year 1816, presented to the National Institute a memoir containing the results of experiments which he had made on the spouting of fluids, and the discharge of vessels. The objects he had in view were to measure the contracted part of a fluid vein, to examine the phenomena attendant on additional tubes, and to investigate and describe the figure of the fluid vein, and the results which take place when different forms of orifices are employed. Hachette showed in the second part of his memoir that greater or lesser volumes of water will be discharged in the same time through tubes of different figures, the apertures in all having the same dimensions. He also gave several remarkable results respecting other fluids issuing out of orifices into air or a vacuum.

Several very interesting experiments on the propagation of waves have been made by the brothers Weber, and by Bidone. Mr. John Scott Russell performed a number of experiments on waves, which are described in the *Edinburgh Transactions*, vol. xiv., and in the *British Association Report* for 1837. The mathematical theory has been worked out by Green, Stokes, Rankine, and other mathematicians, but still offers an interesting field for the investigator. Stokes' Report of the British Association for 1846 on Recent Researches in Hydrodynamics gives an account of the subject as it existed at that date.

In 1826 Bidone, besides his experiments on waves, made a series on the velocity of running water at the hydraulic establishment of the university of Turin, and he published an account of them in 1829. After giving a description of his apparatus and method of experimenting, he gives the figures obtained from fluid veins, sections of which were taken at different distances from the orifice.

In the year 1827 Poncelet published a *Mémoire sur les Roues Hydrauliques à Aubes Courbes*, containing his experiments on the undershot wheel with curved palettes, which he had invented in the year 1824. The best undershot previous to the introduction of the Poncelet wheel never developed more than 0.25 of the work of the water, whereas this utilized 0.60 of that work, which is nearly equivalent to the maximum effect of the breast wheel. The principle on which the Poncelet wheel acts, and that which makes it utilize so much of the work of the water, is that the water is received by the curved floats without any shock, and is discharged finally with a small velocity. This undershot wheel is much used in France.

Previous to the year 1827, the wheels required in the mills and manufactories of Germany and France were generally those which worked with the axis horizontal, or the tub and spoon wheels with the axis vertical; but in that year a young mechanician, named Fourneyron, introduced a wheel working with the axis vertical, yet wholly different from the latter kind. Fourneyron showed that in existing wheels with a vertical axis the water left the wheel with considerable velocity in the direction of the motion of the wheel, and thus carried away and wasted much of the energy of the fall. By the introduction of a series of fixed guide blades, which gave the water initially a backward velocity of rotation, the water left the wheel with a much smaller velocity of discharge. He thus invented the first complete turbine, a kind of water motor which has largely superseded the more cumbrous water wheels previously in use. Shortly after the invention was made public, Fourneyron was awarded the prize of 6,000 francs which was offered by the Society for the Encouragement of National Industry.

The most extensive experiments on the discharge of water from orifices are those made under the direction of the French Government by Poncelet and Lesbros (*Experiences Hydrauliques*, Paris, 1851). Boileau (*Traité de la mesure des eaux courantes*) has discussed these results and added experiments of his own. Bornemann has reëxamined all these results with great care, and has been able to express in formulæ the variation of the coefficients of discharge in different conditions (*Civilingenieur*, 1880). Very valuable experiments leading to a modification of the usual formula for the discharge over weirs were made by Mr. J. B. Francis (*Lowell Hydraulic Experiments*, Boston, Mass., 1855). Wiesbach also has made many experimental investigations of the discharge of fluids.

The friction of water investigated originally by Coulomb at slow speeds has been measured for higher speeds by Mr. W. Froude, whose researches have very great value in the theory of ship resistance.

The flow of air and steam from orifices has been measured by many experimenters from Young to Saint Venant. Mr. Napier in some interesting experiments first pointed out that when the ratio of the pressures on the two sides of an orifice exceeded a certain limit the measured discharge was very different from that calculated by the accepted formulæ. Since then numerous experiments have been made, and the theory of the flow of elastic fluids has been discussed in numerous memoirs. The valuable investigations of Fliegner deserve special mention.

A most valuable investigation of the flow of water in pipes and channels has been carried out with exceptional accuracy and on a very large scale by the late M. Darcy, and continued by his successor, the late M. Bazin, at the expense of the French Government (*Recherches Hydrauliques*, Paris, 1866). The measurement of the flow in rivers has been extensively carried out, especially by German engineers. Harlacher's *Beiträge zur Hydrographie des Königreiches Böhmen* contains exceedingly valuable measurements of this kind, and a comparison of the experimental results with all the formulæ of flow which have been proposed. Messrs. Humphreys and Abbott's gaugings of the Mississippi for the United States Government, Mr. Gordon's gaugings of the Irrawaddi, and Captain Cunningham's experiments on the Ganges Canal may be referred to as having materially advanced hydraulic science.

The first adequate theory of turbines is that of Poncelet in the *Comptes Rendus de l'Academie de Paris*, 1838. Redtenbacher's *Theorie und Bau der Turbinen und Ventilatoren* (Mannheim, 1844) is the first complete treatise on the subject. Girard's turbine, which was of an entirely new type, was discussed in *Le Génie industrielle*, 1856–1857, and lately by Fink (*Civilingenieur*, 1880). Important experiments on turbines were made by Francis (*Lowell Hydraulic Experiments*, Boston, Mass., 1855).

Hydromechanics is the science of the equilibrium and motion of fluids, both elastic and non-elastic. A fluid is defined to be a substance which yields continually to the slightest tangential stress; and, consequently, when the fluid has come to rest, the stress across any surface in the fluid must be normal to the surface.

The stress considered in hydromechanics is always a pressure, as fluids are in general capable of sustaining only a slight tension without disrupture (see CAPILLARY ACTION). The intensity of the pressure is measured, as in the subject of the elasticity, by the number of units of force per unit of area.

The pressure across any surface being normal to the surface, it follows from the general equations of internal stress (see ELASTICITY) that at a point the pressure is the same in all directions about the point.

If forces act throughout the fluid so that the pressure varies from one point to another, we must suppose the tetrahedron taken indefinitely small, and then the impressed forces, depending on the volume, may be neglected in comparison with the forces acting on the faces, which depend on the surface of the tetrahedron.

When fluids such as exist in nature are in motion, the stresses across any surfaces are no longer normal, but tangential stresses are called into play, the intensities of which depend upon the relative motion of the parts of the fluid; those tangential stresses are said to be due to the viscosity of the fluid.

The difference between a solid and a fluid is that in a solid the tangential stress must exceed a certain amount before permanent shearing takes place, otherwise the stress being removed the solid regains its shape; in a fluid the slightest tangential stress produces a permanent deformation, and if continued long enough will cause a complete change of form, however great the viscosity of the fluid may be. But little progress has been made in the theory of the motion of viscous fluids, those cases which have been worked out mostly falling under the head of the practical subject of hydraulics. In the theoretical subject of hydrodynamics the motion of the so-called *perfect* fluids only is considered—fluids in which no viscosity is supposed to exist, and in which therefore the pressure at a point is the same in all directions.

Fluids are divided into two classes, incompressible fluids called liquids, and compressible fluids called gases. The so-called incompressible fluids are in reality compressible, but the compressibility being small is neglected in ordinary problems.

The *compression* of a substance is defined to be the ratio of the diminution of the volume to the original volume; and the *compressibility* is defined to be the ratio of the compression to the pressure producing it. The *elasticity* or *resilience of volume* is the ratio of the pressure to the compression produced, and is therefore the reciprocal of the compressibility. Fluids, from the definition, possess only elasticity of volume; an elastic solid possesses in addition an elasticity of figure, called also the *rigidity*.

The elasticity of water is also proved to exist, and can be determined from the velocity of sound in water; for instance, in water of density unity, the velocity is the square root of the elasticity, and therefore 144,000 centimeters per second, which agrees closely with the velocity determined by experiment.

Compressible fluids or gases are assumed to obey the two gaseous laws.

The first gaseous law, discovered by Boyle, and generally called Boyle's law, asserts that the pressure of a given quantity of a gas at a given temperature varies inversely as the volume, or directly as the density.

The *density* is defined to be the number of units of mass in the unit of volume, and the *specific volume* is the volume of the unit of mass. Hence Boyle's law asserts that the pressure of a gas at a given temperature varies as the density, or inversely as the specific volume.

Dalton generalized Boyle's law for a mixture of gases by enunciating the law that the pressure of a mixture of gases is the sum of the separate pressure each gas would have if it existed alone in the containing vessel.

If we suppose all the gases the same, we are led to Boyle's law, since, if a gram of air in a centimeter cube produces a certain pressure, then two grammes will produce double the pressure, three grammes treble the pressure, and so on; hence the pressure varies as the density. This method of exhibiting Boyle's law is due to Rankine (Maxwell, *Heat*, p. 27).

The second gaseous law was discovered by Charles, but it generally goes by Gay-Lussac's name. It asserts that under constant pressure the volume of a given quantity of every gas increases by about $\frac{1}{273}$ of its volume at 0° C. for a rise of temperature of 1° C.

PART I.—HYDROSTATICS.

Hydrostatics is the science of the equilibrium of fluids. When a fluid has come to rest there can be no tangential stress, and consequently the stress across any surface is normal to the surface, and therefore the same in all directions about a point.

The pressure is the same at all points in a horizontal plane of a liquid at rest under gravity.

For, taking any two points in the same horizontal plane, and joining them, and describing about the joining line as axis an indefinitely thin cylinder, then, since the weight and the pressures on the sides of the cylinder are normal to the axis of the cylinder, resolving parallel to the axis of the cylinder, the pressures on the ends must be equal for equilibrium, and must therefore be of equal intensity.

It follows that the free surface must be a horizontal plane, supposing the pressure uniform over it, and gravity to act in parallel vertical lines.

That the free surface is a plane is verified experimentally by the fact that objects are seen by reflection at the surface undisturbed as in a plane mirror; and that it is a horizontal plane is verified by the fact that a plumb line and its image by reflection at the surface always appear in the same straight line.

The pressure at any point of a liquid at rest under gravity is proportional to the depth.

The pressure at any point of the base being the same and due to the depth below the free surface, whatever be the shape of the sides of the vessel, it follows that the pressure on the base is equal to the weight of the liquid contained in an imaginary cylinder, traced out by vertical lines round the base reaching to the surface.

Archimedes' Principle. — The resultant pressure of a fluid on a body immersed in it acts vertically upward through the center of gravity, and is equal to the weight of the displaced liquid.

For, suppose the body removed and its place filled up with fluid as it would be at rest, and imagine for clearness this fluid solidified. The fluid pressures which act upon this solidified fluid are the same as before, and since the fluid is in equilibrium under its own weight and the fluid pressures, the resultant of the fluid pressures must be a single vertical force equal to the weight of the displaced liquid, and acting upward through the center of gravity of the displaced liquid.

To find the resultant vertical and horizontal pressures on one side of a portion of a surface immersed in fluid at rest under gravity:

The resultant vertical pressure is the weight of the superincumbent fluid contained by vertical lines drawn around the bounding curve of the surface to the free surface. If, however, the free surface does not extend over the surface, we must suppose it made to do so by filling up the empty space with fluid. The line of action of the resultant vertical pressure passes through the center of gravity of this superincumbent fluid.

The resultant horizontal pressure in any direction is equal to the resultant pressure on the plane area traced out on a plane perpendicular to the given horizontal direction by horizontal lines drawn through the bounding line of the surface in the given direction; this plane area is called the orthogonal projection of the surface on a plane perpendicular to the given direction. For, resolving in the given direction the weight of the inclosed liquid and the pressures on the cylindrical surface traced out by the horizontal lines acting in a direction at right angles, the horizontal components of the pressures on the ends balance, which proves the proposition. The line of action of this horizontal pressure passes through the center of pressure of the plane area.

If a plane area be immersed in homogeneous liquid at rest under gravity, the resultant force acting on one side of the area will be the product of the area and the pressure at the center of gravity of the area.

Center of Pressure.—When a plane area is exposed to fluid pressure on one side, the resultant force experienced by the area is a single force perpendicular to the area, the sum of all the separate pressures, and acts through a definite point called the *center of pressure.*

PART II.—HYDRODYNAMICS.

In considering the motion of fluids we suppose them non-viscous, so that whatever be the state of motion, the stress across any section is normal to the section, and therefore the stress is a pressure and the same in all directions about a point, as in Hydrostatics.

Two methods are employed in hydrodynamics, called the Eulerian and Lagrangian, although both are due to Euler; in the Eulerian we fix our attention on particular points of space, and observe the changes of pressure, density, and velocity which take place there, and in the Lagrangian we follow a particle of fluid and observe its changes. The first may be called the statistical and the second the historical method, according to Prof. J. C. Maxwell. The Eulerian method is generally employed except where the fluid has a moving boundary.

PART III.—HYDRAULICS.

1. *Properties of Fluids.*— The fluids to which the laws of practical hydraulics relate are substances the parts of which possess very great mobility, or which offer a very small resistance to distortion independently of inertia. Under the general heading Hydromechanics a fluid is defined to be a substance which yields continually to the slightest tangential stress, and hence in a fluid at rest there can be no tangential stress. But, further, in fluids such as water, air, steam, etc., the tangential stresses that are called into action between contiguous portions during distortion or change of figure are always small compared with the weight, inertia, pressure, etc., which produce the visible motions it is the object of hydraulics to estimate. On the other hand, while a fluid passes easily from one form to another, it opposes considerable resistance to change of volume.

It is easily deduced from the absence or smallness of the tangential stress that contiguous portions of fluid act on each other with a pressure which is exactly or very nearly normal to the interface which separates them. The stress must be a pressure, not a tension, or the parts would separate. Further, at any point in a fluid the pressure in all directions must be the same; or, in other words, the pressure on any small element of surface is independent of the orientation of the surface.

2. Fluids are divided into liquids, or incompressible fluids, and gases, or compressible fluids. Very great changes of pressure change the volume of liquids only by a small amount, and if the pressure on them is reduced to zero they do not sensibly dilate. In gases or compressible fluids the volume alters sensibly for small changes of pressure, and if the pressure is indefinitely diminished they dilate without limit.

In ordinary Hydraulics, liquids are treated as absolutely incompressible. In dealing with gases the changes of volume which accompany changes of pressure must be taken into account.

3. Viscous fluids are those in which change of form under a continued stress proceeds gradually and increases indefinitely. A very viscous fluid opposes great resistance to change of form in a short time, and yet may be deformed considerably by a small stress acting for a long period. A block of pitch is more easily splintered than indented by a hammer, but under the action of the mere weight of its parts acting for a long enough time it flattens out and flows like a liquid.

All actual fluids are viscous. They oppose a resistance to the relative motion of their parts. This resistance diminishes with the velocity of the relative motion, and becomes zero in a fluid the parts of which are relatively at rest. When the relative motion of different parts of a fluid is small, the viscosity may be neglected without introducing important errors. On the other hand, where there is considerable relative motion, the viscosity may be expected to have an influence too great to be neglected.

4. When a fluid flows in a very regular manner, as for instance when it flows in a capillary tube, the velocities vary gradually at any moment from one point of the fluid to a neighboring point. The layer adjacent to the sides of the tube adheres to it and is at rest. The layers more interior than this slide on each other. But the resistance developed by these regular movements is very small. If in large pipes and open channels there were a similar regularity of movement, the neighboring filaments would acquire, especially near the sides, very great relative velocities. Boussinesq has shown that the central filament in a semicircular canal of one meter radius, and inclined at a slope of only 0.0001, would have a velocity of 187 meters per second, the layer next the boundary remaining at rest. But before such a difference of velocity can arise, the motion of the fluid becomes much more complicated. Volumes of fluid are detached continually from the boundaries, and, revolving, form eddies traversing the fluid in all directions, and sliding with finite relative velocities against those surrounding them. These slidings develop resistances, incomparably greater than the viscous resistance due to movements varying continuously from point to point. The movements which produce the phenomena commonly ascribed to fluid friction must be regarded as rapidly or even suddenly varying from one point to another. The internal resistances to the motion of the fluid do not depend on the general velocities of translation at different points of the fluid (or what M. Boussinesq terms the mean local velocities), but rather on the intensity at each point of the eddying agitation. The problems of hydraulics are therefore much more complicated than problems in which a regular motion of the fluid is assumed, hindered by the viscosity of the fluid.

5. *Density of Water.*—Water at ordinary temperature and pressure contains 62.4 pounds per cubic foot, or 1,000 kilogrames per cubic meter, the standard used being always distilled and free as possible from extraneous matter. River and spring water is not sensibly denser than pure water, being at most $\frac{1}{100000}$ heavier. Sea water may be taken at 64 pounds per cubic foot.

6. *Compressibility of Liquids.*—The most accurate experiments show that liquids are sensibly compressed by very great pressures, and that up to a pressure of sixty-five atmospheres, or about 1,000 pounds per square inch, the compression is proportional to the pressure.

7. *Change of Volume and Density of Water with Change of Temperature.*—Although the change of volume of water with change of temperature is so small that it may generally be neglected in ordinary hydraulic calculations, yet it should be noted that there is a change of volume which should be allowed for in very exact calculations.

8. *Relation of Pressure, Volume, Temperature and Density in Compressible Fluids.*—Certain problems on the flow of air and steam are so similar to those relating to the flow of water that they are conveniently treated together. It is necessary, therefore, to state as briefly as possible the properties of compressible fluids so far as knowledge of them is requisite in the solution of these problems. Air may be taken as a type of these fluids, and the data here given will relate to air.

Relation of Pressure and Volume at Constant Temperature.—At constant temperature the product of the pressure and volume of a given quantity of air is a constant.

9. Moving fluids as commonly observed are conveniently classified thus:—

(1) *Streams* are moving masses of indefinite length, completely or incompletely bounded laterally by solid boundaries. When the solid boundaries are complete, the flow is said to take place in a pipe. When the solid boundary is incomplete and leaves the upper surface of the fluid free, it is termed a stream bed or channel or canal.

(2) A stream bounded laterally by differently moving fluid of the same kind is termed a *current.*

(3) A *jet* is a stream bounded by fluid of a different kind.

(4) An *eddy*, *vortex*, or *whirlpool* is a mass of fluid the particles of which are moving circularly or spirally.

(5) In a stream we may often regard the particles as flowing along definite paths in space. A chain of particles following each other along such a constant path may be termed a fluid filament or elementary stream.

10. *Steady and Unsteady, Uniform and Varying Motion.*—There are two quite distinct ways of treating hydrodynamical questions. We may either fix attention on a given mass of fluid and consider its changes of position and energy under the action of the stresses to which it is subjected, or we may have regard to a given fixed portion of space and consider the volume and energy of the fluid entering and leaving that space.

If, in following a given path, a mass of water has a constant velocity, the motion is said to be uniform. The kinetic energy of the mass remains unchanged. If the velocity varies from point to point of the path, the motion is called varying motion. If at a given point in space, the particles of water always arrive with the same velocity and in the same direction, during any given time, then the motion is termed steady motion. On the contrary, if at any point the velocity or direction varies from moment to moment the motion is termed unsteady. Steady motion is sometimes termed permanent motion. A river which excavates its own bed is in unsteady motion so long as the slope and form of the bed are changing. It, however, tends always toward a condition in which the bed ceases to change, and it is then said to have reached a condition of permanent regime. No river probably is in absolutely permanent regime, except perhaps in rocky channels. In other cases the bed is scoured more or less during the rise of a flood, and silted again during the subsidence of the flood. But while many streams of a torrential character change the condition of their bed often and to a large extent, in others the changes are comparatively small and not easily observed.

As a stream approaches a condition which would be strictly defined as one of steady motion, its regime becomes permanent. Hence steady motion and permanent regime are sometimes used as meaning the same thing. The one, however, is a definite term applicable to the motion of the water, the other a less definite term applicable in strictness only to the condition of the stream bed.

11. *Theoretical Notions on the Motion of Water.*—The actual motion of the particles of water is in most cases very complex. To simplify hydrodynamic problems, simpler modes of motion are assumed, and the results of theory so obtained are compared experimentally with the actual motions.

Motion in Plane Layers.—The simplest kind of motion in a stream is one in which the particles initially situated in any plane cross section of the stream continue to be found in plane cross sections during the subsequent motion. Thus, if the particles in a thin plane layer are found again in a thin plane layer after any interval of time, the motion is said to be motion in plane layers. In such motion the internal work in deforming the layer may usually be disregarded, and the resistance to the motion is confined to the circumference.

Laminar Motion.—In the case of streams having solid boundaries, it is observed that the central parts move faster than the lateral parts. To take account of these differences of velocity, the stream may be conceived to be divided into thin laminæ, having cross sections somewhat similar to the solid boundary of the stream, and sliding on each other. The different laminæ can then be treated as having differing velocities according to any law either observed or deduced from their mutual friction. A much closer approximation to the real motion of ordinary streams is thus obtained.

Stream Line Motion.—In the preceding hypothesis, all the particles in each lamina have the same velocity at any given cross section of the stream. If this assumption is abandoned, the cross section of the stream must be supposed divided into indefinitely small areas, each representing the section of a fluid filament. Then these filaments may have any law of variation of velocity assigned to them. If the motion is steady motion these fluid filaments (or, as they are then termed, *stream lines*) will have fixed positions in space.

Periodic Unsteady Motion.—In ordinary streams with rough boundaries, it is observed that at any given point the velocity varies from moment to moment in magnitude and direction, but that the average velocity for a sensible period (say for five or ten minutes) varies very little either in magnitude or velocity. It has hence been conceived that the variations of direction and magnitude of the velocity are periodic, and that, if for each point of the stream the mean velocity and direction of motion were substituted for the actual more or less varying motions, the motion of the stream might be treated as steady stream line or steady laminar motion.

12. When a liquid issues vertically from a small orifice, it forms a jet which rises nearly to the level of the free surface of the liquid in the vessel from which it flows. The difference of level is so small that it may be at once suspected to be due either to air resistance on the surface of the jet or to the viscosity of the liquid or to friction against the sides of the orifice. Neglecting for the moment this small quantity, we may infer, from the elevation of the jet, that each molecule on leaving the orifice possessed the velocity required to lift it against gravity to the height of the liquid in the vessel.

Contraction—Sharp-edged Orifices in Plane Surfaces.—When a jet issues from an aperture in a vessel, it may either spring clear from the inner edge of the orifice or it may adhere to the sides of the orifice. The former condition will be found if the orifice is beveled outward, so as to be sharp-edged, and it will also occur generally for a prismatic aperture, provided the thickness of the vessel around the aperture is less than the diameter of the jet. But if the thickness is greater the fluid will be discharged in a volume whose diameter is equal to that of the orifice.

13. *Bellmouthed Orifices.*—If an orifice is furnished with a mouthpiece exactly of the form of the contracted vein, then the whole of the contraction occurs within the mouthpiece. It is often desirable to bellmouth the ends of pipes, to avoid the loss of head which occurs if this is not done; and such a bellmouth may also have the form of the contracted jet.

14. *Partially Suppressed Contraction.*—Since the contraction of the jet is due to the convergence toward the orifice of the issuing streams, it will be diminished if for any portion of the edge of the orifice the convergence is prevented. Thus, if an internal rim or border is applied to part of the edge of the orifice, the convergence for so much of the edge is suppressed.

15. *Imperfect Contraction.*—If the sides of the vessel approach near to the edge of the orifice, they interfere with the convergence of the streams to which the contraction is due, and the contraction is then modified. It is generally stated that the influence of the sides begins to be felt if their distance from the edge of the orifice is less than 2.7 times the corresponding width of the orifice.

16. *Orifices Furnished with Channels of Discharge.*—The external borders to an orifice also modify the contraction.

Inversion of the Jet.—When a jet issues from a horizontal orifice, or is of small size compared with the head, it presents no marked peculiarity of form. But if the orifice is in a vertical surface, and if its dimensions are not small compared with the head, it undergoes a series of singular changes of form after leaving the orifice.

The jet first contracts as described above, in consequence of the convergence of the fluid streams within the vessel, retaining, however, a form similar to that of the orifice. Afterward it expands into sheets in planes perpendicular to the sides of the orifice. Thus the jet from a triangular orifice expands into three sheets, in planes bisecting at right angles the three sides of the triangle.

17. *Practical Use of Orifices in Gauging Water.*—If the water to be measured is passed through a known orifice under an arrangement by which the constancy of the head is insured, the amount which passes in a given time can be ascertained. It will obviously be best to make the orifices of the forms for which the coefficients are most accurately determined; hence sharp-edged orifices or notches are most commonly used.

Water Inch.—For measuring small quantities of water circular sharp-edged orifices have been used. The discharge from a circular orifice one French inch in diameter, with a head of one line above the top edge, was termed by the older hydraulic writers a water inch. A common estimate of its value was fourteen pints per minute, or 677 English cubic feet in twenty-four hours. An experiment by Bossut gave 634 cubic feet in twenty-four hours (see Navier's edition of *Belidor's Arch. Hydr.*, p. 212).

Weisbach points out that measurements of this kind would be made more accurately with a greater head over the orifice, and he proposes that the head should be equal to the diameter of the orifice. Several equal orifices may be used for larger discharges.

18. *Pin Ferrules or Measuring Cocks.*—To give a tolerably definite supply of water to houses, without the expense of a meter, a ferrule with an orifice of a definite size, or a cock, is introduced in the service-pipe. If the head in the water main is constant, then a definite quantity of water would be delivered in a given time. The arrangement is not a very satisfactory one, and acts

chiefly as a check on extravagant use of water. It is interesting here chiefly as an example of regulation of discharge by means of an orifice. A cock of this kind is used at Zurich. It consists of three cocks, the middle one having the orifice of the predetermined size in a small circular plate, protected by wire gauze from stoppage by impurities in the water. The cock on the right hand can be used by the consumer for emptying the pipes. The one on the left and the measuring cock are connected by a key which can be locked by a padlock which is under the control of the water company.

19. *Measurement of the Flow in Streams.*—To determine the quantity of water flowing off the ground in small streams, which is available for water supply or for obtaining water power, small temporary weirs are often used. These may be formed of planks supported by piles and puddled to prevent leakage. The measurement of the head may be made by a thin-edged scale at a short distance behind the weir, where the water surface has not begun to slope down to the weir and where the velocity of approach is not high. The measurements are conveniently made from a short pile driven into the bed of the river, accurately level with the crest of the weir.

Gauging weirs are most commonly in the form of rectangular notches; and care should be taken that the crest is accurately horizontal, and that the weir is normal to the direction of flow of the stream. If the planks are thick they should be beveled, and the edge may be protected by a metal plate about $\frac{1}{10}$ inch thick to secure the requisite accuracy of form and sharpness of edge. In permanent gauging weirs a cast-steel plate is sometimes used to form the edge of the weir crest. The weir should be large enough to discharge the maximum volume flowing in the stream, and at the same time it is desirable that the minimum head should not be too small (say half a foot) to decrease the effects of errors of measurement. The section of the jet over the weir should not exceed one-fifth the section of the stream behind the weir, or the velocity of approach will need to be taken into account. A triangular notch is very suitable for measurements of this kind.

If the flow is variable, the head must be recorded at equidistant intervals of time, say twice daily, and then for each twelve-hour period the discharge must be calculated for the mean of the heads at the beginning and end of the time. As this involves a good deal of troublesome calculation, Mr. Sang has proposed to use a scale so graduated as to read off the discharge in cubic feet per second.

The accurate measurement of the discharge of a stream by means of a weir is, however, in practice, rather more difficult than might be inferred from the simplicity of the principle of the operation.

20. *Hook Gauge.*—For the determination of the surface level of water, the most accurate instrument is the hook gauge used first by Mr. U. Boyden of Boston, in 1840. It consists of a fixed frame with scale and vernier. In the instrument, the vernier is fixed to the frame, and the scale slides vertically. The scale carries at its lower end a hook with a fine point, and the scale can be raised or lowered by a fine pitched screw. If the hook is depressed below the water surface and then raised by the screw, the moment of its reaching the water surface will be very distinctly marked, by the reflection from a small capillary elevation of the water surface over the point of the hook. In ordinary light, differences of level of the water of .001 of a foot are easily detected by the hook gauge. If such a gauge is used to determine the heads at a weir, the hook should first be set accurately level with the weir crest, and a reading taken. Then the difference of the reading at the water surface and that for the weir crest will be the head at the weir.

21. *Modules used in Irrigation.*—In distributin water for irrigation, the charge for the water may b simply assessed on the area of the land irrigated fo each consumer, a method followed in India; or a regulated quantity of water may be given to each consumer, and the charge may be made proportional to the quantity of water supplied, a method employed for a long time in Italy and other parts of Europe. To deliver a regulated quantity of water from the irrigation channel, arrangements termed modules are used. These are constructions intended to maintain a constant or approximately constant head above an orifice of fixed size, or to regulate the size of the orifice so as to give a constant discharge, notwithstanding the variation of level in the irrigating channel.

22. *Italian Module.*—The Italian modules are masonry constructions, consisting of a regulating chamber, to which water is admitted by an adjustable sluice from the canal. At the other end of the chamber is an orifice in a thin flagstone of fixed size. By means of the adjustable sluice a tolerably constant head above the fixed orifice is maintained, and therefore there is a nearly constant discharge of ascertainable amount through the orifice, into the channel leading to the fields which are to be irrigated.

23. *Spanish Module.*—On the canal of Isabella II., which supplies water to Madrid, a module much more perfect in principle than the Italian module is employed. Part of the water is supplied for irrigation, and as it is very valuable its strict measurement is essential. The module consists of two chambers one above the other, the upper chamber being in free communication with the irrigation canal, and the lower chamber discharging by a culvert to the fields. In the arched roof between the chambers there is a circular sharp-edged orifice in a bronze plate. Hanging in this there is a bronze plug of variable diameter suspended from a hollow brass float. If the water level in the canal lowers, the plug descends and gives an enlarged opening, and conversely. Thus a perfectly constant discharge with a varying head can be obtained, provided no clogging or silting of the chambers prevents the free discharge of the water or the rise and fall of the float.

24. *Reservoir Gauging Basins.*—In obtaining the power to store the water of streams in reservoirs, it is usual to concede to riparian owners below the reservoirs a right to a regulated supply throughout the year. This compensation water requires to be measured in such a way that the millowners and others interested in the matter can assure themselves that they are receiving a proper quantity, and they are generally allowed a certain amount of control as to the times during which the daily supply is discharged into the stream.

25. *Steady Flow of Compressible Fluids.—External Work during the Expansion of Air.*—If air expands without doing any external work, its temperature remains constant. This result was first experimentally demonstrated by Joule. It leads to the conclusion that, however air changes its state, the internal work done is proportional to the change of temperature. When, in expanding, air does work against an external resistance, either heat must be supplied or the temperature falls.

26. *Friction of Liquids.*—When a stream of fluid flows over a solid surface, or conversely when a solid moves in still fluid, a resistance to the motion is generated, commonly termed fluid friction. It is due to the viscosity of the fluid, but generally the laws of fluid friction are very different from those of simple viscous

resistance. It would appear that at all speeds, except the slowest, rotating eddies are formed by the roughness of the solid surface, or by abrupt changes of velocity distributed throughout the fluid; and the energy expended in producing these eddying motions is gradually lost in overcoming the viscosity of the fluid in regions more or less distant from that where they are first produced.

The laws of fluid friction are generally stated thus:—

(1.) The frictional resistance is independent of the pressure between the fluid and the solid against which it flows. This may be verified by a simple direct experiment. Coulomb, for instance, oscillated a disk under water, first with atmospheric pressure acting on the water surface, afterward with the atmospheric pressure removed. No difference in the rate of decrease of the oscillations was observed. The chief proof that the friction is independent of the pressure is that no difference of resistance has been observed in water mains and in other cases, where water flows over solid surfaces under widely different pressures.

(2.) The frictional resistance of large surfaces is proportional to the area of the surface.

(3.) At low velocities of not more than one inch per second for water, the frictional resistance increases directly as the relative velocity of the fluid and the surface against which it flows. At velocities of one-half foot per second and greater velocities, the frictional resistance is more nearly proportional to the square of the relative velocity.

In many treatises on hydraulics it is stated that the frictional resistance is independent of the nature of the solid surface. The explanation of this was supposed to be that a film of fluid remained attached to the solid surface, the resistance being generated between this fluid layer and layers more distant from the surface. At extremely low velocities the solid surface does not seem to have much influence on the friction. In Coulomb's experiments a metal surface covered with tallow, and oscillated in water, had exactly the same resistance as a clean metal surface, and when sand was scattered over the tallow the resistance was only very slightly increased. The earlier calculations of the resistance of water at higher velocities in iron and wood pipes and earthen channels seemed to give a similar result. These, however, were erroneous, and it is now well understood that differences of roughness of the solid surface very greatly influence the friction, at such velocities as are common in engineering practice. Darcy's experiments, for instance, showed that in old and incrusted water mains the resistance was twice or sometimes thrice as great as in new and clean mains.

27. *Steady Flow of Water in Pipes of Uniform Section.*—The ordinary theory of the flow of water in pipes, on which all practical formulæ are based, assumes that the variation of the velocity at different points of any cross section may be neglected. The water is considered as moving in plane layers, which are driven through the pipe against the frictional resistance, by the difference of pressure at or elevation of the ends of the pipe. If the motion is steady the velocity at each cross section remains the same from moment to moment, and if the cross sectional area is constant the velocity at all sections must be the same. Hence the motion is uniform. The most important resistance to the motion of the water is the surface friction of the pipe, and it is convenient to estimate this independently of some smaller resistances which will be accounted for presently.

28. *Scraping Water Mains.*—The influence of the condition of the surface of a pipe on the friction is shown by various facts known to the engineers of waterworks. Pipes are very often heated and dipped in pitch, which gives them a smooth, hard surface and protects them from oxidation. Such pipes are known to give a discharge larger than that calculated by the ordinary formulæ. In pipes which convey certain kinds of water oxidation proceeds rapidly, and the discharge is very perceptibly and sometimes very greatly diminished. In a main laid at Torquay the discharge diminished from this cause more than 50 per cent., and the supply became insufficient for the town. Mr. Appold suggested an apparatus for scraping the interior of the pipe, and this was constructed and tried under the direction of Mr. Froude. It was found that by scraping the interior of the pipe the discharge was increased 56 per cent. The scraping requires to be repeated at intervals. After each scraping the discharge diminishes rather rapidly to 10 per cent. and afterward more slowly, the diminution in a year being about 25 per cent.

FLOW OF COMPRESSIBLE FLUIDS IN PIPES.

29. *Flow of Air in Long Pipes.*—When air flows through a long pipe, by far the greater part of the work expended is used in overcoming frictional resistances due to the surface of the pipe. The work expended in friction generates heat, which for the most part must be developed in and given back to the air. Some heat may be transmitted through the sides of the pipe to surrounding materials, but in experiments hitherto made the amount so conducted away appears to be very small, and if no heat is transmitted the air in the tube must remain sensibly at the same temperature during expansion. In other words, the expansion may be regarded as isothermal expansion, the heat generated by friction exactly neutralizing the cooling due to the work done. Experiments on the pneumatic tubes used for the transmission of messages, by Messrs. Culley & Sabine, show that the change of temperature of the air flowing along the tube is much less than it would be in adiabatic expansion.

30. *Application to the Case of Pneumatic Tubes for the Transmission of Messages.*—In Paris, Berlin, London, and other towns, it has been found cheaper to transmit messages in pneumatic tubes than to telegraph by electricity. The tubes are laid underground with easy curves; the messages are made into a roll and placed in a light felt carrier, the resistance of which in the tubes in London is only ¾ oz. A current of air forced into the tube or drawn through it propels the carrier. In most systems the current of air is steady and continuous, and the carriers are introduced or removed without materially altering the flow of air.

31. *Flow of Water in Open Canals and Rivers.*—When water flows in a pipe the section at any point is determined by the form of the boundary. When it flows in an open channel with free upper surface, the section depends on the velocity due to the dynamical conditions.

Suppose water admitted to an unfilled canal. The channel will gradually fill, the section and velocity at each point gradually changing. But if the inflow to the canal at its head is constant, the increase of cross section and diminution of velocity at each point attain after a time a limit. Thenceforward the section and velocity at each point are constant, and the motion is steady, or permanent regime is established.

32. *Experimental Observations on the Vertical Velocity Curve.*—In obtaining the vertical velocity curve from direct observations in streams, a preliminary difficulty arises from the fact that the velocity at any given depth is not constant, and hence the motion in the strict

sense is not steady. The velocities taken on a given vertical section at any given moment do not form, when plotted, any regular curve. But if a series of observations are taken at each depth and the results averaged, the mean velocities at each depth, when plotted, give a regular curve, agreeing very fairly with the parabola, which might be expected from the theory above. Hence it may be inferred that the velocity at any given point fluctuates about a mean value, the fluctuations being due to irregular eddying motions superposed on the general steady motion of the stream, and having an effect which disappears in the mean of a series of observations. For certain purposes these irregular motions may be ignored, and the constant mean velocity substituted for the actual varying velocities at each point. In the next place, all the best observations show that the maximum velocity is to be found, not at the free surface of the stream, but at some distance below it.

Influence of the Wind.— In the experiments on the Mississippi the vertical velocity curve in calm weather was found to agree fairly with a parabola, the greatest velocity being at three-tenths of the depth of the stream from the surface. With a wind blowing down-stream the surface velocity is increased, and the axis of the parabola approaches the surface. On the contrary, with a wind blowing up-stream the surface velocity is diminished, and the axis of the parabola is lowered, sometimes to half the depth of the stream. The American observers drew from their observations the conclusion that there was an energetic retarding action at the surface of a stream like that due to the bottom and sides. If there were such a retarding action the position of the filament of maximum velocity below the surface would be explained.

It is not difficult to understand that a wind acting on surface ripples should accelerate or retard the surface motion of the stream, and the Mississippi results may be accepted so far as showing that the surface velocity of a stream is variable when the mean velocity of the stream is constant. Hence observations of surface velocity by floats or otherwise should only be made in very calm weather. But it is very difficult to suppose that, in still air, there is a resistance at the free surface of the stream at all analogous to that at the sides and bottom. Further, in very careful experiments, Boileau found the maximum velocity, though raised a little above its position for calm weather, still at a considerable distance below the surface, even when the wind was blowing down-stream with a velocity greater than that of the stream, and when the action of the air must have been an accelerating and not a retarding action. Prof. James Thomson has given a much more probable explanation of the diminution of the velocity at and near the free surface. He points out that portions of water, with a diminished velocity from retardation by the sides or bottom, are thrown off in eddying masses and mingle with the rest of the stream. These eddying masses modify the velocity in all parts of the stream, but have their greatest influence at the free surface. Reaching the free surface, they spread out and remain there, mingling with the water at that level and diminishing the velocity which would otherwise be found there.

33. *Influence of the Wind on the Depth at which the Maximum Velocity is found.*—In the gaugings of the Mississippi the vertical velocity curve was found to agree well with a parabola having a horizontal axis at some distance below the water surface, the ordinate of the parabola at the axis being the maximum velocity of the section. During the gaugings the force of the wind was registered on a scale ranging from 0 for a calm to 10 for a hurricane. Arranging the velocity curves in three sets—(1) with the wind blowing up-stream, (2) with the wind blowing down-stream, (3) calm or wind blowing across-stream—it was found that an up-stream wind lowered, and a down-stream wind raised, the axis of the parabolic velocity curve. In calm weather the axis was at three-tenths of the total depth from the surface for all conditions of the stream.

34. *River Bends.*—In rivers flowing in alluvial plains, the windings which already exist tend to increase in curvature by the scouring away of material from the outer bank and the deposition of detritus along the inner bank. The sinuosities sometimes increase till a loop is formed with only a narrow strip of land between the two encroaching branches of the river. Finally a "cut-off" may occur, a waterway being opened through the strip of land and the loop left separated from the stream, forming a horseshoe-shaped lagoon or marsh. Professor James Thomson has pointed out that the usual supposition is that the water tending to go forward in a straight line, rushes against the outer bank and scours it, at the same time creating deposits at the inner bank. That view is very far from a complete account of the matter, and Professor Thomson has given a much more ingenious account of the action at the bend, which he has completely confirmed by experiment.

When water moves around a circular curve under the action of gravity only, it takes a motion like that in a free vortex. Its velocity is greater parallel to the axis of the stream at the inner than at the outer side of the bend. Hence the scouring at the outer side and the deposit at the inner side of the bend are not due to mere difference of velocity of flow in the general direction of the stream; but, in virtue of the centrifugal force, the water passing around the bend presses outward, and the free surface in a radial cross section has a slope from the inner side upward to the outer side. For the greater part of the water flowing in curved paths, this difference of pressure produces no tendency to transverse motion. But the water immediately in contact with the rough bottom and sides of the channel is retarded, and its centrifugal force is insufficient to balance the pressure due to the greater depth at the outside of the bend. It therefore flows inward toward the inner side of the bend, carrying with it detritus which is deposited at the inner bank. Conjointly with this flow inward along the bottom and sides, the general mass of water must flow outward to take its place.

35. *Steady Motion of Water in Open Channels of Varying Cross Section and Slope.*—In every stream the discharge of which is constant, or may be regarded as constant for the time considered, the velocity at different places depends on the slope of the bed. Except at certain exceptional points the velocity will be greater as the slope of the bed is greater, and, as the velocity and cross section of the stream vary inversely, the section of the stream will be least where the velocity and slope are greatest. If in a stream of tolerably uniform slope an obstruction such as a weir is built, that will cause an alteration of flow similiar to that of an alteration of the slope of the bed for a greater or less distance above the weir, and the originally uniform cross section of the stream will become a varied one. In such cases it is often of much practical importance to determine the longitudinal section of the stream.

36. *On Streams and Rivers.—Catchment Basin.*—A stream or river is the channel for the discharge of the available rainfall of a district, termed its catchment basin. The catchment basin is surrounded by a ridge or watershed line, continuous except at the point where the river finds an outlet. The area of the catchment basin may be determined from a suitable contoured map

on a scale of at least 1 in 100,000. Of the whole rainfall on the catchment basin, a part only finds its way to the stream. Part is directly re-evaporated, part is absorbed by vegetation, part may escape by percolation into neighboring districts.

37. *Flood Discharge.*—The flood discharge can generally only be determined by examining the greatest height to which floods have been known to rise. To produce a flood the rainfall must be heavy and widely distributed, and to produce a flood of exceptional height the duration of the rainfall must be so great that the floodwaters of the most distant affluents reach the point considered, simultaneously with those from nearer points. The larger the catchment basin the less probable is it that all the conditions tending to produce a maximum discharge should simultaneously occur. Further, lakes and the river bed itself act as storage reservoirs during the rise of water level and diminish the rate of discharge, or serve as flood moderators. The influence of these is often important, because very heavy rainstorms are in most countries of comparatively short duration.

38. *Action of a Stream on its Bed.*—If the velocity of a stream exceeds a certain limit, depending on its size, and on the size, heaviness, form, and coherence of the material of which its bed is composed, it scours its bed and carries forward the materials. The quantity of material which a given stream can carry in suspension depends on the size and density of the particles in suspension, and is greater as the velocity of the stream is greater. If in one part of its course the velocity of a stream is great enough to scour the bed and the water becomes loaded with silt, and in a subsequent part of the river's course the velocity is diminished, then part of the transported material must be deposited. Probably deposit and scour go on simultaneously over the whole river bed, but in some parts the rate of scour is in excess of the rate of deposit, and in other parts the rate of deposit is in excess of the rate of scour. Deep streams appear to have the greatest scouring power at any given velocity. It is possible that the difference is strictly a difference of transporting, not of scouring action.

39. *Regime of a River Channel.*—A river channel is said to be in a state of regime, or stability, when it changes little in draught or form in a series of years. In some rivers the deepest part of the channel changes its position perpetually, and is seldom found in the same place in two successive years. The sinuousness of the river also changes by the erosion of the banks, so that in time the position of the river is completely altered. In other rivers the change from year to year is very small, but probably the regime is never perfectly stable except where the rivers flow over a rocky bed.

If a river had a constant discharge it would gradually modify its bed till a permanent regime was established. But as the volume discharged is constantly changing, and therefore the velocity, silt is deposited when the velocity decreases, and scour goes on when the velocity increases in the same place. When the scouring and silting are considerable, a perfect balance between the two is rarely established, and hence continual variations occur in the form of the river and the direction of its currents. In other cases, where the action is less violent, a tolerable balance may be established, and the deepening of the bed by scour at one time is compensated by the silting at another. In that case the general regime is permanent, though alteration is constantly going on. This is more likely to happen if by artificial means the erosion of the banks is prevented. If a river flows in soil incapable of resisting its tendency to scour it is necessarily sinuous, for the slightest deflexion of the current to either side begins an erosion which increases progressively till a considerable bend is formed. If such a river is straightened it becomes sinuous again unless its banks are protected from scour.

40. *Longitudinal Section of River Bed.*—The declivity of rivers decreases from source to mouth. In their higher parts rapid and torrential, flowing over beds of gravel or bowlders, they enlarge in volume by receiving affluent streams, their slope diminshes, their bed consists of smaller materials, and finally they reach the sea.

41. *Surface Level of River.*—The surface level of a river is a plane changing constantly in position from changes in the volume of water discharged, and more slowly from changes in the river bed, and the circumstances affecting the drainage into the river.

For the purposes of the engineer, it is important to determine (1) the extreme low-water level, (2) the extreme high-water or flood level, and (3) the highest navigable level.

(1) *Low-Water Level* cannot be absolutely known, because a river reaches its lowest level only at rare intervals, and because alterations in the cultivation of the land, the drainage, the removal of forests, the removal or erection of obstructions in the river bed, etc., gradually alter the conditions of discharge. The lowest level of which records can be found is taken as the conventional or approximate low-water level, and allowance is made for possible changes.

(2) *High Water or Flood Level.*—The engineer assumes as the highest flood level the highest level of which records can be obtained. In forming a judgment of the data available, it must be remembered that the highest level at one point of a river is not always simultaneous with the attainment of the highest level at other points, and that the rise of a river in flood is very different in different parts of its course. In temperate regions, the floods of rivers seldom rise more than twenty feet above low water level, but in the tropics the rise of floods is greater.

(3) *Highest Navigable Level.*—When the river rises above a certain level, navigation becomes difficult from the increase of the velocity of the current, or from submersion of the towpaths, or from the headway under bridges becoming insufficient. Ordinarily the highest navigable level may be taken to be that at which the river begins to overflow its banks.

42. *Relative Value of Different Materials for Submerged Works.*—That the power of water to remove and transport different materials depends on their density has an important bearing on the selection of materials for submerged works. In many cases, as in the aprons or floorings beneath bridges, or in front of locks or falls, and in the formation of training walls and breakwaters by *pierres perdus*, which have to resist a violent current, the materials of which the structures are composed should be of such a size and weight as to be able individually to resist the scouring action of the water. The heaviest materials will therefore be the best; and the different value of materials in this respect will appear much more striking, if it is remembered that all materials lose part of their weight in water.

43. *Inundation Deposits from a River.*—When a river carrying silt periodically overflows its banks, it deposits silt over the area flooded, and gradually raises the surface of the country. The silt is deposited in greatest abundance where the water first leaves the river. It hence results that the section of the country assumes a peculiar form, the river flowing in a trough along the crest of a ridge, from which the land slopes downward on both sides. The silt deposited from the water forms two wedges, having their thick ends toward the river.

This is strikingly the case with the Mississippi, and that river is now kept from flooding immense areas by artificial embankments or levees. In India, the term *deltaic segment* is sometimes applied to that portion of a river running through deposits formed by inundation, and having this characteristic section. The irrigation of the country in this case is very easy; a comparatively slight raising of the river surface by a weir or annicut gives a command of level which permits the water to be conveyed to any part of the district.

44. *Deltas.*—The name delta was orginally given to the Δ-shaped portion of Lower Egypt, included between seven branches of the Nile. It is now given to the whole of the alluvial tracts around river mouths formed by deposition of sediment from the river, where its velocity is checked on its entrance to the sea. The characteristic feature of these alluvial deltas is that the river traverses them, not in a single channel, but in two or many bifurcating branches. Each branch has a tract of the delta under its influence, and gradually raises the surface of that tract, and extends it seaward. As the delta extends itself seaward, the conditions of discharge through the different branches change. The water finds the passage through one of the branches less obstructed than through the others; the velocity and scouring action in that branch are increased; in the others they diminish. The one channel gradually absorbs the whole of the water supply, while the other branches silt up. But as the mouth of the new main channel extends seaward the resistance increases both from the greater length of the channel and the formation of shoals at its mouth, and the river tends to form new bifurcations, and one of these may in time become the main channel of the river.

45. *Field Operations preliminary to a Study of River Improvement.*—There are required (1) a plan of the river, on which the positions of lines of leveling and cross sections are marked; (2) a longitudinal section and numerous cross sections of the river; (3) a series of gaugings of the discharge at different points and in different conditions of the river.

Longitudinal Section.—This requires to be carried out with great accuracy. A line of stakes is planted, following the sinuosities of the river and chained and leveled. The cross sections are referred to the line of stakes, both as to position and direction. To determine the slope of the water surface great care is necessary.

46. *Cross Sections.*—A stake is planted flush with the water, and its level relatively to some point on the line of levels is determined. Then the depth of the water is determined at a series of points (if possible at uniform distances) in a line starting from the stake and perpendicular to the thread of the stream. To obtain these, a wire may be stretched across with equal distances marked on it by hanging tags. The depth at each of these tags may be obtained by a light wooden staff, with a disk-shaped shoe four to six inches in diameter. If the depth is great, soundings may be taken by a chain and weight. To insure the wire being perpendicular to the thread of the stream, it is desirable to stretch two other wires similarly graduated, one above and the other below, at a distance of twenty to forty yards. A number of floats being then thrown in, it is observed whether they pass the same graduation on each wire.

47. *Measurement of the Discharge of Rivers.*—The area of cross section multiplied by the mean velocity gives the discharge of the stream. The height of the river with reference to some fixed mark should be noted whenever the velocity is observed, as the velocity and area of cross section are different in different states of the river. To determine the mean velocity various methods may be adopted; and, since no method is free from liability to error, either from the difficulty of the observations or from uncertainty as to the ratio of the mean velocity to the velocity observed, it is desirable that more than one method should be used.

48. *Instruments for Measuring the Velocity of Water.*—*Surface Floats* are convenient for determining the surface velocities of a stream, though their use is difficult near the banks. The floats may be small balls of wood, of wax, or of hollow metal, so loaded as to float nearly flush with the water surface. To render them visible they may have a vertical painted stem. In experiments on the Seine, cork balls one and three-fourth inches in diameter were used, loaded to float flush with the water, and provided with a stem. In Captain Cunningham's observations at Roorkee, the floats were thin circular disks of English deal, three inches diameter and one-fourth of an inch thick. For observations near the banks, floats one inch in diameter and one-eighth of an inch thick were used. To render them visible a tuft of cotton wool was used loosely fixed in a hole at the center.

49. *Sub-surface Floats.*—The velocity at different depths below the surface of a stream may be obtained by sub-surface floats, used precisely in the same way as surface floats. The most usual arrangement is to have a large float, of slightly greater density than water, connected with a small and very light surface float. The motion of the combined arrangement is not sensibly different from that of the large float, and the small surface float enables an observer to note the path and velocity of the sub-surface float. The instrument is, however, not free from objection. If the large submerged float is made of very nearly the same density as water, then it is liable to be thrown upward by very slight eddies in the water, and it does not maintain its position at the depth at which it is intended to float. On the other hand, if the large float is made sensibly heavier than water, the indicating or surface float must be made rather large, and then it to some extent influences the motion of the submerged float.

Impact and Reaction of Water.—When a stream of fluid impinges on a solid surface, it presses on the surface with a force equal and opposite to that by which the velocity and direction of motion of the fluid are changed. Generally, in problems on the impact of fluids, it is necessary to neglect the effect of friction between the fluid and the surface on which it moves.

50. *During Impact the Velocity of the Fluid relatively to the Surface on which it impinges remains unchanged in Magnitude.*—Consider a mass of fluid flowing in contact with a solid surface also in motion, the motion of both fluid and solid being estimated relatively to the earth. Then the motion of the fluid may be resolved into two parts, one a motion equal to that of the solid, and in the same direction, the other a motion relatively to the solid. The motion which the fluid has in common with the solid cannot at all be influenced by the contact. The relative component of the motion of the fluid can only be altered in direction, and not in magnitude. The fluid moving in contact with the surface can only have a relative motion parallel to the surface, while the pressure between the fluid and solid, if friction is neglected, is normal to the surface. The pressure, therefore, can only deviate the fluid, without altering the magnitude of the relative velocity. The unchanged common component and, combined with it, the deviated relative component give the resultant final velocity, which may differ greatly in magnitude and direction from the initial velocity.

51. Down to a recent period the resistance of ships was supposed to be due to a difference between the

pressure on the bow and stern, caused by the pushing aside of the water. Hence the resistance was supposed to be proportional to the immersed midship sectional area of the vessel. In a "fair" body, completely immersed, there is no resistance of this kind, the pressure of the water closing in behind exactly balancing the excess of pressure on the bow. In such a body, therefore, the resistance is almost entirely due to the frictional drag of the water on the surface of the body, and is proportional to its skin area. In a ship, which is only partially immersed, a further resistance, which in some cases becomes very large, is due to the alteration of the surface level of the water causing a dissipation of energy in producing waves.

52. *Hydraulic Machinery.*—Hydraulic machinery may be broadly divided into hydraulic motor machines and pumps. In the former class, a quantity of water descending from a higher to a lower level, or from a higher to a lower pressure, drives a machine which receives energy from the water, and applies it to overcoming the resistances of other machines doing useful work. In the latter class, work done on the machine by a steam engine or other source of energy is employed in lifting water from a lower to a higher level. A few machines such as the ram and jet pump combine the functions of motors and pumps.

In every system of machinery deriving energy from a natural waterfall there exist the following parts:

(1) A supply channel or head race, leading the water from the highest accessible level to the site of the machine. This may be an open channel of earth, masonry, or wood, laid at as small a slope as is consistent with the delivery of the necessary supply of water, or it may be a closed cast or wrought-iron pipe, laid at the natural slope of the ground, and about three feet below the surface. In some cases part of the head race is an open channel, part a closed pipe. The channel often starts from a small storage reservoir, constructed near the stream supplying the water motor, in which the water accumulates when the motor is not working. There are sluices or penstocks by which the supply can be cut off when necessary.

(2) Leading from the motor there is a tail race, culvert, or discharge pipe delivering the water after it has done its work at the lowest convenient level.

(3) A waste channel, weir, or by-wash is placed on or at the origin of the head race, by which surplus water, in floods, escapes.

(4) The motor itself, of one of the kinds to be described presently, which either overcomes a useful resistance directly, as in the case of a ram acting on a lift or crane chain, or indirectly by actuating transmissive machinery, as when a turbine drives the shafting, belting, and gearing of a mill. With the motor is usually combined regulating machinery for adjusting the power and speed to the work done. This may be controlled in some cases by automatic governing machinery.

Water Motors with Artificial Sources of Energy.—The great convenience and simplicity of water motors has led to their adoption in certain cases, where no natural source of water power is available. In these cases, an artificial source of water power is created by using a steam engine to pump water to a reservoir at a great elevation, or to pump water into a closed reservoir in which there is great pressure. The water flowing from the reservoir through hydraulic engines gives back the energy expended, less so much as has been wasted in friction. Such arrangements are most useful where a continuously acting steam engine stores up energy by pumping the water, while the work done by the hydraulic engines is done intermittently.

Wherever a stream flows from a higher to a lower level it is possible to erect a water motor. The amount of power obtainable depends on the available head and the supply of water. In choosing a site the engineer will select a portion of the stream where there is an abrupt natural fall, or at least a considerable slope of the bed. He will have regard to the facility of constructing the channels which are to convey the water, and will take advantage of any bend in the river which enables him to shorten them. He will have accurate measurements made of the quantity of water flowing in the stream, and he will endeavour to ascertain the average quantity available throughout the year, the minimum quantity in dry seasons, and the maximum for which by-wash channels must be provided. In many cases the natural fall can be increased by a dam or weir thrown across the stream. The engineer will also examine to what extent the head will vary in different seasons, and whether it is necessary to sacrifice part of the fall and give a steep slope to the tail race to prevent the motor being drowned by backwater in floods.

In designing or selecting a water motor it is not sufficient to consider only its efficiency in normal conditions of working. It is generally quite as important to know how it will act with a scanty water supply or a diminished head. The greatest difference in water motors is in their adaptability to varying conditions of working.

Water motors may be divided into water-pressure engines, water wheels, and turbines.

Water-pressure engines are machines with a cylinder and piston or ram, in principle identical with the corresponding part of a steam engine. The water is alternately admitted to and discharged from the cylinder, causing a reciprocating action of the piston or ram. It is admitted at a high pressure and discharged at a low one, and consequently work is done on the piston. The water in these machines never acquires a high velocity, and for the most part the kinetic energy of the water is wasted. The useful work is due to the difference of the pressure of admission and discharge, whether that pressure is due to the weight of a column of water of more or less considerable height, or is artificially produced in ways to be described presently.

Water wheels are large vertical wheels driven by water falling from a higher to a lower level. In most water wheels, the water acts directly by its weight loading one side of the wheel and so causing rotation. But in all water wheels a portion and in some a considerable portion of the work due to gravity is first employed to generate kinetic energy in the water; during its action on the water wheel the velocity of the water diminishes, and the wheel is therefore in part driven by the impulse due to the change of the water's momentum. Water wheels are therefore motors on which the water acts, partly by weight, partly by impulse.

Turbines are wheels, generally of small size compared with water wheels, driven chiefly by the impulse of the water. Before entering the moving part of the turbine, the water is allowed to acquire a considerable velocity; during its action on the turbine this velocity is diminished, and the impulse due to the change of momentum drives the turbine.

Roughly speaking, the fluid acts in a water-pressure engine directly by its pressure, in a water wheel chiefly by its weight causing a pressure, but in part by its kinetic energy, and in a turbine chiefly by its kinetic energy, which again causes a pressure.

Water-Pressure Engines.—In these water acts by simple pressure due to the height of the column in the supply pipe or the pressure in the supply reservoir. The water acts on a piston or ram which it displaces.

When the height of the column exceeds 100 or 200 feet, or there is a pressure equivalent to this, water wheels are inapplicable, and turbines have the disadvantage that in such circumstances their speed is very great. Then water-pressure engines may be very conveniently adopted. In other cases they are generally too cumbrous.

When an incompressible fluid such as water is used to actuate piston engines, two special difficulties arise. One is that the waste of work in friction is very great, if the water attains considerable velocity; another is that there is great straining action on the machinery. The violent straining action due to the more or less sudden arrest of the motion of water in machinery is termed hydraulic shock. For these reasons the maximum velocity of flow of water in hydraulic machines should generally not exceed five to ten feet per second. Under very high pressure, where there is less object in economizing energy, and it is very important to keep the dimensions of the machinery small, Mr. Anderson gives twenty-four feet per second as the limiting velocity. In large water-pressure engines used for pumping mines, the average piston speed does not exceed one-half to two feet per second.

HYDROMETER. The object of the hydrometer is the determination of the density of bodies, generally of fluids, but some forms of the instrument are adapted to the determination of the density of solids.

It is shown that, when a body floats in a fluid under the action of gravity, the weight of the body is equal to that of the fluid which it displaces. It is upon this principle that the hydrometer is constructed, and it obviously admits of two modes of application in the case of fluids; either we may compare the weights of floating bodies which are capable of displacing the same volume of different fluids, or we may compare the volumes of the different fluids which are displaced by the same weight. In the latter case, the densities of the fluids will be inversely proportional to the volumes thus displaced.

Perhaps the simplest method of experimentally determining the densities of different liquids is afforded by the series of areometrical glass beads, or hollow balls, first proposed by Doctor Wilson, professor of astronomy in the university of Glasgow. As subsequently improved by Mrs. Lovi, these beads were constructed in sets, each bead in the set differing in density from its predecessor by .002 (of the density of water). Each bead is numbered according to its density, and in order to determine the specific gravity of a liquid it is only necessary to throw into it the set of beads, or so many of them as are known to include between their extremes the density of the liquid, when all the beads whose densities exceed that of the liquid will sink, while those whose densities are less than that of the liquid will float. If there is a bead of exactly the same density as the liquid, it will rest in any position, provided it is completely immersed. Failing this, all that is immediately apparent is that the density is intermediate between that of the lighest bead that sinks and that of the heaviest that floats.

The hydrometer is said by Synesius Cyreneus in his fifth letter to have been invented by Hypatia at Alexandria, but appears to have been neglected until it was reinvented by Robert Boyle, whose "New Essay Instrument," as described in the *Phil. Trans.* for June, 1675, differs in no essential particular from Nicholson's hydrometer. This instrument was devised for the purpose of detecting counterfeit coin, especially guineas and half-guineas. In the first section of the paper the author refers to a glass instrument exhibited by himself many years before, and "consisting of a bubble furnished with a long and slender stem, which was to be put into several liquors, to compare and estimate their specific gravities." This seems to be the first reference to the hydrometer in modern times.

The first hydrometer intended for the determination of the densities of liquids, and furnished with a set of weights to be attached when necessary, was that constructed by Mr. Clarke, and described by Dresaguliers in the *Philosophical Transactions* for March and April, 1730.

Clarke's hydrometer, as afterward constructed for the purposes of the excise, was provided with thirty-two weights to adapt it to spirits of different specific gravities, and eleven smaller weights, or "weather weights," as they were called, which were attached to the instrument in order to correct for variations of temperature. The weights were adjusted for successive intervals of 5° Fahr., but for degrees intermediate between these no additional correction was applied. The correction for temperature thus afforded was not sufficiently accurate for excise purposes, and Mr. Speer in his essay on the hydrometer mentions cases in which this imperfect compensation led to the extra duty payable upon spirits which were more than 10 per cent. over proof being demanded on spirits which were purposely diluted to below 10 per cent. over proof in order to avoid the charge.

Desaguliers himself constructed a hydrometer of the ordinary type for comparing the specific gravities of different kinds of water. In order to give great sensibility to the instrument, the large glass ball was made nearly three inches in diameter, while the stand consisted of a wire ten inches in length and only $\frac{1}{40}$ inch in diameter. The instrument weighed 4,000 grains, and the addition of a grain caused it to sink through an inch. By altering the quantity of the shot in the small balls the instrument could be adapted for liquids other than water.

To an instrument constructed for the same purpose, but on a still larger scale than that of Desaguliers, M. Deparcieux added a small dish on the top of the stem for the reception of the weights necessary to sink the instrument to a convenient depth. The effect of weights placed in such a dish or pan is, of course, the same as if they were placed within the bulb of the instrument, since they do not alter the volume of that part which is immersed.

The first important improvement in the hydrometer after its re-invention by Boyle was introduced by Fahrenheit, who adopted the second mode of construction above referred to, arranging his instrument so as always to displace the same volume of liquid, its weight being varied accordingly. Instead of a scale, only a single mark is placed upon the stem, which is very slender, and bears at the top a small scale pan into which weights are placed until the instrument sinks to the mark upon its stem. The volume of the displaced liquid being then always the same, its density will be proportional to the whole weight supported, that is, to the weight of the instrument together with the weights required to be placed in the scale pan.

In comparing the densities of different liquids, it is clear that this instrument is precisely equivalent to that of Fahrenheit, and must be employed in the same manner, weights being placed in the top scale only until the hydrometer sinks to the mark on the wire, when the specific gravity of the liquid will be proportioned to the weight of the instrument together with the weights in the scale.

In the subsequent portion of the paper above referred to, Nicholson explains how the instrument may be employed as a thermometer, since, fluids generally expanding more than the solids of which the instrument is constructed, the instrument will sink as the temperature rises.

To determine the density of solids heavier than water with this instrument, let the solid be placed in the upper scale pan, and let the weight now required to cause the instrument to sink in distilled water at standard temperature to the mark B be denoted by w, while W denotes the weight required when the solid is not present. Then $W-w$ is the weight of the solid. Now let the solid be placed in the lower pan, care being taken that no bubbles of air remain attached to it, and let w_1 be the weight now required in the scale pan. This weight will exceed w in consequence of the water displaced by the solid, and the weight of the water thus displaced will be w_1-w, which is therefore the weight of a volume of water equal to that of the solid. Hence, since the weight of the solid itself is $W-w$, its density must be $\frac{W-w}{w_1-w}$.

The above example illustrates how Nicholson's or Fahrenheit's hydrometer may be employed as a weighing machine for small weights.

In all hydrometers in which a part only of the instrument is immersed, there is a liability to error in consequence of the surface tension, or capillary action, as it is frequently called, along the line of contact of the instrument and the surface of the liquid (see CAPILLARY ACTION). This error diminishes as the diameter of the stems is reduced, but is sensible in the case of the thinnest stem which can be employed, and is the chief source of error in the employment of Nicholson's hydrometer, which otherwise would be an instrument of extreme delicacy and precision. The following is Nicholson's statement on this point:—

"One of the greatest difficulties which attends hydrostatical experiments arises from the attraction or repulsion that obtains at the surface of the water. After trying many experiments to obviate the irregularities arising from this cause, I find reason to prefer the simple one of carefully wiping the whole instrument, and especially the stem, with a clean cloth. The weights in the dish must not be esteemed accurate while there is either a cumulus or a cavity in the water around the stem."

HYDROPATHY is the treatment of disease by water, used outwardly and inwardly. Like many descriptive names, the word "hydropathy" is defective and even misleading, the active agents in the treatment being heat and cold, of which water is little more than the vehicle, and not the only one. Thermo-therapeutics (or thermotherapy) is a term less open to objection. The name "hydropathy," however, as being itself an advance on an earlier and less happy designation, "the water cure," as having obtained general currency, is here employed.

Hydropathy, as a system, or mode of treatment complete in itself, dates from about 1829, when Vincenz Priessnitz (1801–51), a farmer of Gräfenberg in Silesia, Austria, began his public career in the paternal homestead, extended so as to accommodate the increasing numbers attracted by the fame of his cures. Two English works, however, on the medical uses of water had been translated into German in the century preceding the rise of the movement under Priessnitz. One of these was by Sir John Floyer, a physician of Lichfield, who, struck by the remedial use of certain springs by the neighboring peasantry, investigated the history of cold bathing, and published in 1702 his *History of Cold Bathing, both Ancient and Modern.* The other work was that of Doctor Currie of Liverpool, entitled *Medical Reports on the Effects of Water, Cold and Warm, as a Remedy in Fevers and other Diseases*, published in 1797, and soon after translated into German. It was highly popular, and first placed the subject on a scientific basis. Hahn's writings had meanwhile created much enthusiasm among his countrymen, societies having been everywhere formed to promote the medicinal and dietetic use of water; and in 1804 Professor Oertel of Ansbach republished them and quickened the popular movement by unqualified commendation of water drinking as a remedy for all diseases. In him the rising Priessnitz found a zealous advocate, and doubtless an instructor also. The origin of hydropathy is thus to be traced to an English source and to the medical profession. The broad conception that water had curative relations to the whole realm of disease seems to have been first grasped by a Capuchin monk of Sicily, Father Bernardo, who, at Malta, in 1724, obtained results by iced water alone, which, according to Hahn, caused a great stir throughout Europe; but, owing to the excesses of his imitators, it was of no long duration. With this exception there is, as regards the remedial use of water, nothing in the history of medicine that approaches in completeness the system of Priessnitz, though much leading up to it can be discovered. Among most primitive peoples, indeed, both in the Old and in the New World, the existence of one kind or another of hydropathic practice can be traced; and the fathers of medicine made frequent reference in their writings to the employment of water. The warm bath came into use at an early period (see BATHS); and the clyster, shower bath, douche, plunge, wet compress, drop bath, head and foot baths, are mentioned from time to time, as also combinations of heat and cold and primitive modes of sweating, until, before the end of the seventeenth century, all the processes of modern hydropathy, the wet sheet pack and induced cutaneous crisis alone excepted, had become known and were in a measure practiced.

At Gräfenberg, to which the fame of Priessnitz drew people of every rank and many countries, medical men were conspicuous by their numbers, some being attracted by curiosity, others by the desire of knowledge, but the majority by the hope of cure for ailments which had as yet proved incurable. Many records of experiences at Gräfenberg were published, all more or less favorable to the claims of Priessnitz, and some enthusiastic in their estimate of his genius and penetration; and from these alone can a knowledge of his practice and views be obtained, not a line having ever been written by this singular man. To Captain Claridge was due the introduction in 1840 of hydropathy to England, his writings and lectures, and later those of Doctors Wilson, Gully, and Edward Johnson, making numerous converts, and filling the establishments opened soon after at Malvern and elsewhere. In Germany, France, and America hydropathic establishments multiplied with great rapidity. Antagonism ran high between the old practice and the new. Unsparing condemnation was heaped by each on the other; and a legal prosecution, leading to a royal commission of inquiry, served but to make Priessnitz and his system stand higher in public estimation.

But increasing popularity diminished before long that timidity which hitherto had in great measure prevented trial of the new method from being made on the weaker and more serious class of cases, and had caused hydropathists to occupy themselves mainly with a sturdy order of chronic invalids well able to bear a rigorous regimen and the severities of unrestricted crisis. The need of a radical adaptation to the former class was first adequately recognized by John Smedley, a manufacturer of Derbyshire, who, impressed in his own person with the severities as well as the benefits of "the cold water cure," practiced among his workpeople a milder form of hydropathy, and began about 1852 a new era in its history, founding at Matlock a counterpart of the establishment at Gräfenberg.

While hydropathy as a system has been gaining favor with the people, and receiving ample acknowledgment from the more liberal members of the medical profession, individual measures have from time to time been advocated in the medical journals and adopted more or less widely in particular diseases. Brand of Berlin, Räljen and Jürgensen of Kiel, and Liebermeister of Basel, between 1860 and 1870, employed the cooling bath in abdominal typhus with results which, after every deduction on the score of defective classification had been made, were striking enough, and led to its introduction to England by Dr. Wilson Fox, whose able monograph commanded general acceptance. In the Franco-German war the cooling bath was largely employed, in conjunction frequently with quinine; and it now holds a recognized position in the treatment of hyperpyrexia. The wet sheet pack has of late been much used in fevers of all kinds, both in private and hospital practice; and the Turkish bath, introduced about twenty-four years ago by Mr. David Urquhart on his return from the East, and ardently adopted by Mr. Barter of Cork, has become a public institution, and, with the "morning tub" and the general practice of water drinking, is the most noteworthy of the many contributions by hydropathy to public health.

The theoretical basis of hydropathy is wide and fundamental enough to include within its scope all disease. Each individual cell of the mass constituting in various forms and combinations the human body being in its growth and function dependent on and regulated by the nervous and vascular systems, themselves cellular, and every derangement of these cells originating in or being attended with a derangement of their nervous and vascular supply, and that supply being powerfully and in quite diverse ways influenced by heat and cold—all morbid conditions of the economy may be influenced materially by the regulated employment of heat and cold, which are entitled therefore to rank as powerful factors in therapeutics.

Hydropathy insists in quite a special way on the necessity of regarding disease first in relation to its cause. It next requires that whatever assistance may be afforded to the *vis medicatrix naturæ* should in the first place be similar in kind (*i.e.*, should be natural or physiological), rather than alien to it and drawn from sources remote and strange; and, while proceeding on lines which have been common to all medical practice from an early period, it does so by agents hitherto strangely neglected, though not unknown, and effects its purpose in ways less open to objection than those it would displace. For example, when local depletion is required, as of the lung in pneumonia, or the brain in hemorrhagic apoplexy, the final withdrawal from the general circulation of a quantity of blood is deprecated as unnecessary for the attainment of the object in view, and prejudicial in the after period of convalescence. Hydropathy substitutes a diversion to parts indifferent, as the extremities and general cutaneous surface, and so material and sustained as to be much more effectual; while at the same time it holds in reserve the abstracted blood to perform its part in the restoration of strength. Where purgation is employed to derive blood from the brain, liver, or kidneys, a highly sensitive and vital membrane is more or less injured thereby, and convalescence proportionately imperiled. Hydropathy selects the skin as more accessible than the mucous membrane of the alimentary tract, more serviceable also, and less, if at all, susceptible of injury, either temporary or permanent. The skin can with safety be used for counter-irritation, and is a reservoir of capacity almost unlimited, into which to divert the excess of blood from the brain or other part, while for purposes of excretion it is not inferior to the bowels themselves, and, unlike the latter, is left even more efficient than before. In the febrile state, a reduction of pulse and temperature, and relief from pain and sleeplessness, were commonly attempted, at the period when hydropathy was introduced, by depressants, as antimony, ipecacuanha, and perhaps large doses of alcohol, in combination with sedatives, as opium and chloral. Impaired digestion and depressed vitality were results in some measure inevitable, and always of moment, especially in the more protracted fevers, where recovery becomes a question often of simple physical endurance. By means of the wet sheet pack, cooling compresses, spongings, and allied measures, these ends are attained with comparative ease, certainty, and simplicity, and with entire freedom from objectionable secondary effects.

The agents of hydropathy are at once simple and complex—simple in their elements, and complex in their combinations and modifications. They afford the physician a series of effects almost infinite in variety, both in kind and in degree, both immediate and remote. According as heat and cold are used in their extreme or intermediate degrees, singly or in combination, successively or alternately, momentarily or continuously, dry or moist, and according as the primary action is utilized or the secondary, do their effects differ. The direct or primary effect of cold is to depress, cool, and deplete the part concerned. If its exhibition is brief, reaction (an important factor in hydropathic practice) quickly establishes an opposite condition, stimulating the part, and determining an increased flow of blood to it, with increase of its temperature and vital activity. If it is continuous, the primary depression is maintained, and the revulsive or secondary effect delayed or averted. The direct effect of heat is to increase the amount of blood present; but if the exhibition is brief, and evaporation is permitted, the contrary effect is produced, viz., depression, coolness, and depletion; if it is continuous, the primary effect is preserved. Thus with truth it may be said that cold heats and heat cools, while the converse holds good, and that by simple variations of detail. From the intermediate temperatures (80° to 100°) simple sedative effects are obtained, with absence of secondary or revulsive effects in proportion as the temperature of the part is approximated to. Results vary also according to the heat of the subject. In local inflammations, continuous cold benumbs and contracts, continuous heat soothes and relaxes. Momentary cold excites, heats by reaction, and intensifies inflammation; while momentary heat soothes and ultimately cools the inflamed part by the after evaporation. In the earlier stages and acute varieties of inflammation, therefore, continuous cold or transient hot applications are appropriate, and brief applications of cold in the later, congestive, and chronic forms. But where the local inflammation coëxists with general feverishness, continuous cold as the local application is preferable, helping, as it does, to reduce the general exaltation of temperature. In collapse the low general temperature makes heat the best local application. On internal parts the application of heat and cold externally has definite therapeutic effects either identical or opposite (as remarked by John Hunter) through reflex or sympathetic nervous action. Through the vascular system also remote effects are produced, as in heating the lower extremities to derive blood from the brain. The counter relation also of the entire cutaneous surface to the internal organs, as the kidneys and alimentary mucous membrane, is, in hydropathy, largely utilized for remedial purposes. This sympathy is familiar enough in the etiology of disease, which may be said likewise of all the physiological laws applied to curative purposes in hydropathy.

The appliances and arrangements by means of which heat and cold are brought to bear on the economy are —(*a*) packings, hot and cold, general and local, sweating and cooling; (*b*) hot air and steam baths; (*c*) general baths, of hot water and cold; (*d*) sitz, spinal, head, and foot baths; (*e*) bandages (or compresses), wet and dry; also (*f*) fomentations and poultices, hot and cold, sinapisms, stupes, rubbings, and water potations, hot and cold.

(*a.*) *Packings.*—The full pack consists of a wet sheet enveloping the body, with a number of dry blankets packed tightly over it, including a mackintosh covering or not. In an hour or less these are removed and a general bath administered. The pack is a derivative, sedative, sudorific, and stimulator of cutaneous excretion. There are numerous modifications of it, notably the cooling pack, where the wrappings are loose and scanty, permitting evaporation, and the application of indefinite duration, the sheet being rewetted as it dries; this is of great value in protracted febrile conditions. There are also local packs, to trunk, limbs, or head separately, which are derivative, soothing, or stimulating, according to circumstance and detail.

(*b.*) Hot-air baths, the chief of which is the Turkish (properly, the Roman) bath, consisting of two or more chambers ranging in temperature from 120° to 212° or higher, but mainly used at 150° for curative purposes. Exposure is from twenty minutes up to two hours, according to the effect sought, and is followed by a general bath, and occasionally by soaping and shampooing. It is stimulating, derivative, depurative, sudorific, and alterative, powerfully promoting tissue change by increase of the natural waste and repair. It determines the blood to the surface, reducing internal congestions, is a potent diaphoretic, and, through the extremes of heat and cold, is an effective nervous and vascular stimulant and tonic. Morbid growths and secretions, as also the uræmic, gouty and rheumatic diathesis, are beneficially influenced by it. The full pack and Turkish bath have between them usurped the place and bettered the function of the once familiar hot bath. The Russian or steam bath, and the lamp bath are primitive and inferior varieties of the modern Turkish bath, the atmosphere of which cannot be too dry and pure.

(*c.*) General baths comprise the rain (or needle), spray (or rose), shower, shallow, plunge, douche, wave and common morning sponge baths, with the dripping sheet, and hot and cold spongings, and are combinations, as a rule, of hot and cold water. They are stimulating, tonic, derivative and detergent.

(*d.*) Local baths comprise the sitz (or sitting), douche (or spouting), spinal, foot and head baths, of hot or cold water, singly or in combination, successive or alternate. The sitz, head and foot baths are used "flowing" on occasion. Rapid alternations of hot and cold water have a powerful effect in vascular stasis and lethargy of the nervous system and absorbents, yielding valuable results in local congestions and chronic inflammations.

(*e.*) Bandages (or compresses) are of two kinds—*cooling*, of wet material left exposed for evaporation, used in local inflammations and fevers; and *heating*, of the same, covered with waterproof material, used in congestion, external or internal, for short or long periods. Poultices, warm, of bread, linseed, bran, etc., changed but twice in twenty-four hours, are identical in action with the heating bandage, and superior only in the greater warmth and consequent vital activity their closer application to the skin insures.

(*f.*) Fomentation and poultices, hot or cold, sinapisms, stupes, rubefacients, irritants, frictions, kneadings, calisthenics, gymnastics, electricity, etc., are adjuncts largely employed in hydropathic practice. Water drinking, while still an important factor in hydropathy, has declined somewhat since the early times of the system.

But that which has from the first distinguished modern hydropathy, and still makes its strict practice a thing apart, is the "crisis," so called. It is related of Priessnitz that, when a boy of fourteen, and treating a sprain, as was the native custom, with wet cloths, he observed an eruption appear beneath them, with the immediate recovery of the part. Gradually the significance and wider application of this eruption dawned upon him, until it came to hold so prominent a place in his practice as to be regarded by many as his greatest discovery.

The eruption coinciding in point of time with recovery as a rule, it was called the crisis, involving doubtless a reference to the term as used by Hippocrates and his successors. But with Priessnitz crisis attained a higher rank, a wider application, and a more definite character. He first showed it to be producible at will under given conditions of the patient, and amenable to direction and control. This eruption, it is claimed, appears only in morbid states of the blood (cachexia) resulting from derangement or defect in the organs of assimilation or excretion or both (*e. g.*, gout, rheumatism), or from the presence of a specific poison (*e. g.*, syphilis). The continuous application to a given tract of skin of the heating bandage or poultice (mediums merely for the exhibition of warmth and moisture) stimulates, in a cumulative way, its vascular and nervous activity, and leads, it may be in a few days or weeks (in some cases hours, in others months), to an eruption, papular, then pustular, and ultimately resolving itself into a suppurating surface commensurate with the area covered by the bandage. There is, in the latter stage, a copious discharge of yellowish-green pus, usually fetid, varied occasionally with patches of brown, blue, or metallic green, and accompanied with itching, sometimes intense. The general temperature is not, as a rule, disturbed; the pulse, except perhaps for the first day or two, falls, if previously quick, to a natural rate; the weight and strength, in the most favorable cases from the outset, and in the rest later on, increase, and it is not uncommon to find the anomaly of a patient exulting in freedom from suffering and a return of the impulses of health simultaneously with the appearance of an extensive inflammation of the skin. The applications, continued without intermission and unaltered (save as cleanliness requires) for weeks or months, according to the nature of the case, are at last no more stained with pus but with serum simply; and finally, still without change of application, the skin will heal, or at most, show a little psoriasis, pityriasis, or eczema, or, it may be, but a faint tinge of red. The bandages are then withdrawn. The original symptoms meanwhile have disappeared with more or less celerity and completeness; and with the eruption has departed the disease that called for it and made it possible. Strength grows apace, no longer taxed by disease or crisis, until recovery in appropriate cases is absolute and secure.

Occasionally the cutaneous inflammation extends in the form of psoriasis, eczema, sudamina, a papular rash or a succession of boils, invading parts untouched by the wet compress. This is called a general crisis; it usually occurs in the last stage of the local one, sometimes after it has ceased, and is advantageous and transient. Debility, whether preëxisting or consequent on the crisis, may call for some modification of its severity and duration, whether by installments at proper intervals, or curtailment in the later stages, the natural emunctories being relied on to complete the work of purification at greater leisure. A residuum of incurable organic degeneration, as of the kidneys or liver, may likewise put limits to recovery, and provide perpetual material for crisis until the patient is worn out in a vain and ignorant attempt at cure. It was the failure of the earlier hydropathists—through inexperience, default of medical education, or inordinate enthusiasm—to recognize these limitations, that brought crisis into its present discredit and comparative desuetude. Where it is necessary from these or other causes to relieve the patient of the eruption, the substitution of simple ointment, unsalted lard, or other oleaginous or viscid material for the stimulating bandages, or poultices, permits the excitement to subside, and, with occasional exceptions, the skin, in a few days, it may be hours, bears little trace of the eruption.

In the course of hydropathic treatment there occur, though rarely, attacks of diarrhœa, sickness, diuresis, or diaphoresis, which, having been observed frequently to mark the turning point in the history of the case, are held to be varieties of crisis, disturbances attendant on the expulsion of the *materies morbi* from the system.

The theory of crisis may be stated thus: The digestive and assimilative organs are, as is well known, involved, whether primarily or secondarily, in by far the majority of morbid conditions. Their product, the blood, undergoing constant renewal, becomes necessarily more or less impaired—deprived of the blandness that pertains alone to a pure and perfect condition, with what may be termed an inflammatory disposition as the result. The most familiar, because pronounced, forms are the gouty, rheumatic, tubercular, and strumous diatheses. Later the excretory organs, in common with the whole economy, must more or less become deranged, with additions, in consequence, to the sum of morbid elements in the blood, such as uræmic and biliary matters. A vicious circle of action and reaction is established from which escape is difficult, if not impossible, in its more pronounced developments. The digestive disorder begets imperfect and impure blood, and the morbid blood keeps up, and *cæteris paribus* increases, the initial and originating digestive disorder. In all but its most advanced stages ordinary measures, hydrophatic or other, may suffice to break this chain, and, by eliminating one or more of its links, render recovery possible, or accomplish it. It is when the complication is beyond their reach that the domain peculiar to crisis begins. The superior vascularity and vitality of the digestive organs—the alimentary tract of mucous membrane, the pancreas, and the liver—is what makes them (in addition to their susceptibility to injury through errors in diet) so commonly the seat of diseased action. The highly nervous and vascular structure of the skin makes easy its elevation to at least an equality in vital activity with the mucous membrane. Warmth and moisture continuously applied to a given portion will, in time, effect this, aided doubtless by maceration and denudation of the cuticle and exposure of the sensitive *cutis vera*. It thus becomes the seat of greatest vital activity; preëminence in morbid activity naturally follows, and a genuine metastasis is effected, such as the natural history of disease is rich in examples of. There is a decline, *pro tanto*, of the primary internal disorder under this combined pressure, first by the diversion of morbific elements, and then by the diversion of an appreciable quantity of the blood itself, and by counter-irritation, when the site of the vicarious inflammation has been selected with that in view. The aid of a sustained derivation to the entire cutaneous surface and the extremities is at the same time secured by means of the Turkish bath, full packs, and other stimulating agents, while, at the same time, due care is taken to eliminate and negative the original causes of disease. The sum of morbid activity is for the time being increased and intensified; but, in the new location, no longer self-supporting and self-perpetuating, it is sooner or later exhausted. The change in the relation of the *materies morbi* to the digestive system puts an end at one and the same time to the originating and sustaining conditions. The failure of simple counter-irritation (where, as by sinapisms, vesicatories, etc., the irritant is derived from without) to effect the same result in many of the cases afterward cured by crisis negatives of itself the view that the results of the latter are to be attributed to the element in it of counter-irritation alone.

HYDROPHOBIA, from φοβέω, water, and ὕδωρ, I fear (Syn. *Rabies*, *Lyssa*), an acute infectious disease, occurring chiefly in certain of the lower animals, particularly the canine species, and liable to be communicated by them to other animals, and to man. The main features of the disease are similar alike in the lower animals and men, but that peculiar symptom from which the malady derives its name, viz., the dread of water, appears only to affect the latter. Rabies as it manifests itself in animals belongs to the subject of veterinary medicine; the present notice refers only to hydrophobia occurring in man. The disease has been known from early times, and is alluded to in the works of Aristotle, Xenophon, Plutarch, Virgil, Horace, Ovid, and many others, as well as in those of the early writers on medicine. Celsus gives detailed instructions respecting the treatment of men who have been bitten by rabid dogs, and dwells on the dangers attending such wounds. In later times the investigations of Boerhaave, Van Swieten, John Hunter, Magendie, Breschet, Virchow, Reder, as also of Youatt, Fleming, Meynell, Hertwig, Pasteur, and others, have furnished important information; nevertheless much remains obscure as to the nature and pathology of this formidable disease.

Whatever may be said as to the spontaneous development of rabies in animals—a view which is now generally discredited—there can be no doubt that in man the disease is in every instance the result of the inoculation of the virus contained in the secretions of the mouth of the affected animal into a wound or abrasion of the skin or mucous membrane. In the great majority of cases (90 per cent.) this is due to the bite of a rabid dog, but bites of rabid cats, wolves, foxes, jackals, etc., are occasionally the means of conveying the disease. There is no evidence that the poison can be introduced into the system without an abrasion of the surface. But it must be observed that even of those who have undoubtedly been bitten by rabid animals, only a proportion subsequently suffer from hydrophobia. Thus where the bite has been inflicted on a part of the body protected by clothing, the virus may be wiped from the teeth of the animal before they penetrate the skin. Hence it is found that bites on exposed parts such as the face are very much more dangerous than on other parts which are ordinarily covered. But further, individual susceptibility must be taken into account, for it is undeniable that many persons in whom the virus of rabies has been inoculated escape hydrophobia. John Hunter mentions one remarkable instance in which of twenty-one persons bitten by a rabid dog only one subsequently died from hydrophobia; and a comparison of the best authorities would seem to show that the proportion of those who are attacked with the disease to those who are bitten is less than one-half. Numerous popular fallacies prevail on the subject of hydrophobia. Thus it is supposed that the bite of an angry dog may produce the disease, and all the more if the animal should subsequently develop symptoms of rabies. The ground for this erroneous notion is the fact, which is unquestionable, that animals in whom rabies is in the stage of incubation, during which there are few if any symptoms, may by their bites convey the disease, though fortunately during this early state they are little disposed to bite. The bite of a non-rabid animal, however enraged, cannot give rise to hydrophobia. Another fallacious notion, not altogether of popular origin, but maintained by a few eminent professional authorities, is to the effect that there is no such disease as hydrophobia at all, but that the symptoms designated by that name are entirely mental phenomena produced by the effect of fear of the consequences following a bite. It might be sufficient as a reply to this to point to the uniform sequence of terrible symptoms which mark the progress of the malady when it has commenced, and to its acute course and invariably fatal termination; but there is the additional fact that very young children, in whom this feeling could scarcely be expected to operate, may suffer and die from hydrophobia.

The period of incubation of the disease, or that time which elapses between the introduction of the virus and the development of the symptoms, appears to vary in a remarkable degree, being in some cases as short as a fortnight and in others as long as several months or even years. On an average it seems to be from about six weeks to three months. The rare instances of the appearance of hydrophobia many years after the introduction of the poison are always more or less open to question as to subsequent inoculation. During the period of latency, in which the patient seems perfectly well, it is supposed that the poison is undergoing a sort of multiplication, both in the previously wounded part and in the system at large, somewhat analogous to the fermentive process, and that ultimately it comes to tell with deadly effect upon certain portions of the nervous system.

When the disease is about to declare itself it not infrequently happens that the wound, which had quickly and entirely healed after the bite, begins to exhibit evidence of irritation or inflammatory action, or at least to be the seat of morbid sensation such as numbness, tingling, or itching. The symptoms characterizing the premonitory stage are great mental depression and disquietude, together with restlessness and a kind of indefinite fear. There is an unusual tendency to talk, and the articulation is abrupt and rapid. Although in some instances the patients will not acknowledge that they have been previously bitten, and deny it with great obstinacy, yet generally they are well aware of the nature of their malady, and speak despairingly of its consequences. There is in this early stage a certain amount of constitutional disturbance showing itself by feverishness, loss of appetite, sleeplessness, headache, great nervous excitability, respiration of a peculiar sighing or sobbing character, and even occasionally a noticeable aversion to liquids. These symptoms—constituting what is termed the melancholic stage—continue in general for one or two days, when they are succeeded by the stage of excitement in which all the characteristic phenomena of the malady are fully developed. Sometimes the disease first shows itself in this stage, without antecedent symptoms.

The agitation of the sufferer now becomes greatly increased, and the countenance exhibits anxiety and terror. There is noticed a marked embarrassment of the breathing, but the most striking and terrible features of this stage are the effects produced by attempts to swallow fluids. The patient suffers from thirst and desires eagerly to drink, but on making the effort is seized with a most violent suffocative paroxysm produced by spasm of the muscles of swallowing and breathing, which continues for several seconds, and is succeeded by a feeling of intense alarm and distress. With great caution and determination the attempt is renewed, but only to be followed with a repetition of the seizure, until the unhappy sufferer ceases from sheer dread to try to quench the thirst which torments him. Indeed the very thought of doing so suffices to bring on a choking paroxysm, as does also the sound of the running of water. The patient is extremely sensitive to any kind of external impression; a bright light, a loud noise, a breath of cool air, contact with anyone, are all apt to bring on one of these seizures. But besides these suffocative attacks there also occur general convulsions affecting the whole muscular system of the body, and occasionally a condition of tetanic spasm. These various paroxysms increase in frequency and severity with the advance of the disease, but alternate with intervals of comparative quiet, in which, however, there is intense anxiety and more or less constant difficulty of breathing, accompanied with a peculiar sonorous expiration, which has suggested the notion that the patient barks like a dog. In many instances there is a great mental disturbance, with fits of maniacal excitement, in which he strikes at everyone about him, and accuses them of being the cause of his sufferings—these attacks being succeeded by calm intervals in which he expresses great regret for his violent behavior. During all this stage of the disease the patient is tormented with a viscid secretion accumulating in his mouth, which from dread of swallowing he is constantly spitting about him. There may also be noticed snapping movements of the jaws as if he were attempting to bite, but these are in reality a manifestation of the spasmodic action which affects the muscles generally. There is no great amount of fever, but there is constipation, diminished flow of urine, and often sexual excitement.

After two or three days of suffering of the most terrible description the patient succumbs, death taking place either in a paroxysm of choking, or on the other hand in a tranquil manner from exhaustion, all the symptoms having abated, and the power of swallowing returned before the end. The duration of the disease from the first declaration of the symptoms is generally from three to five days.

M. Louis Pasteur, the great French bacterialogist, has of late years given the subject of hydrophobia and its source, together with the nature of its specific virus, and mode of prevention, his almost undivided attention. The medical world is as yet divided in opinion as to the value of the results and conclusions arrived at by him. But the fact that previous positions taken by this eminent man in relation to other subjects, more or less cognate, have been found in the majority of instances to be correct, should certainly give due weight to his postulates in regard to this as to any other special subject of his investigation.

A brief summary of his investigations presents the following facts for our consideration:—First, that the virus from a rabid animal can be intensified or attenuated by transmission from animal to animal, the concentration or attenuation depending entirely on the species of animal employed as a vehicle. Thus the virus passed through a series of rabbits increases in intensity, while that passed successively from one monkey to another loses its power in a like manner. Second, that the spinal cord of a rabbit which has died of rabies (the cord being the organ most affected by the disease, and generally the part used in making inoculations from one animal to another), when kept in a perfectly dry atmosphere, loses its capability of transmitting rabies in proportion to the length of time it is kept, until after the fourteenth day of preservation it becomes entirely innocuous. He also lays down as a fact that the virus from a dog's spinal cord injected into the brain of a rabbit will produce rabies in the rabbit in *fourteen* days; the virus from the cord of a rabbit thus treated will, if taken fresh (immediately after the death of the animal) and injected into another rabbit, produce rabies in *seven* days—thus showing greater virulence, being twice as quick as the virus from a dog. But on the other hand, as stated before, if the spinal cord of a rabbit dying from rabies be preserved in dry air it loses its intensity. These facts are the basis of all his experiments. His method of procedure in fortifying the system against hydrophobia is as follows: He takes the spinal cord of a rabbit fourteen days after the death of the animal from rabies, and injects the virus therefrom into the system by hypodermic syringe; then he injects virus from a more recently deceased rabbit (say thirteen days) and so on in descending scale of time from the date of the animal's death, until the subject is able to bear perfectly fresh virus without feeling any inconvenience. It seems that the preceding weaker inoculation renders the succeeding stronger one innocuous. M. Pasteur experimented on forty-two dogs, twenty-three thus protected and nineteen unprotected by inoculation. He then injected fresh virus into all of them, and of the twenty-three protected only one died and that one not from rabies, but from diarrhœa. Of the nineteen unprotected fourteen died from rabies. In July, 1885, he made his first attempt on humanity by inoculating Joseph Meister, a boy who had just been bitten. This boy received twelve injections of virus, M. Pasteur making parallel injections on animals. As he approached the fresher virus a number of the animals (rabbits) died of rabies, but the boy passed the ordeal unharmed and was discharged by M. Pasteur as a successful case. Since that time several hundreds of cases have been treated by Pasteur's method, and only two cases of failure have been reported—one of a patient who was bitten thirty-six days before the treatment began, and the other of several Russians who had been bitten by wolves. It is claimed, however, that wolf virus is more powerful than that of the dog, and this being so, the cases cannot be considered a fair test, especially when the unavoidable delay in treatment is taken into account.

It is important to be able to recognize the symptoms of rabies in a dog, and to this end we would advise that when a dog is observed to change in his manner without apparent adequate cause he had best be looked on with suspicion. Especially if a well-fed dog evince an appetite for unusual articles of diet, such as bits of wood, straw, coal, his own dung and urine, and other morbid substances, he should be confined at once and not be allowed access to any person until at least two weeks have passed. He is generally in the initiatory stage restless, feverish, fond of changing his position of lying down, irritable, and loses his appetite. His entire nature in cases seems to change, obeying his master with reluctance, if at all, and he seems to seek solitude rather than companionship of human friends. Sometimes he starts up, barking furiously at imaginary sounds, snaps at imaginary flies, and exhibits general brain excitement or derangement.

The dangerous stage now supervenes, and the animal will, if unconfined, run at large and bite or snap at any animal or person he meets; if he be confined his rage is sometimes unbounded and he attempts to destroy even inanimate objects. The natural disposition of the dog has, however, something to do with his behavior at this time. Mr. Youatt mentions instances where a dog did not attempt to bite, but exhibited melancholy rather than rage. Then, after the furious stage has spent itself, the animal dies of exhaustion in from five to twelve days after the beginning of the attack.

The rule of common sense is: if your dog acts suspiciously, confine him where he can do no harm. More especially if he bite anyone, keep him confined till you are sure whether he has or has not the disease. Do not at once kill him and leave the matter forever in doubt to worry the subject of the bite by perhaps groundless fears.

HYDROZOA.—The Hydrozoa form one of the three classes into which the Cœlentera nematophora (distinguished from the Cœlentera porifera, or sponges) have been divided—recognized as such in the article CŒLENTERA, to which the reader is referred. The Hydrozoa correspond to the Linnæan genera Hydra, Tubularia, Sertularia, and Medusa. The name was applied by Huxley in 1856 to a group corresponding to that termed Hydromedusæ by Vogt (1851) and Medusæ by Leuckart (1853), and embracing the forms placed by Gegenbaur in his *Elements of Comparative Anatomy* (1878) in four classes, viz., Hydromedusæ, Calycozoa, Thecomedusæ, and Medusæ. Our knowledge of the structure and life-history of the Hydrozoa, many of which, on account of their delicacy and oceanic habits, are expressly difficult to obtain in a state fit for investigation, has greatly extended within the last five years. While in the two decades preceding this period the admirable researches of Huxley, Gegenbaur, Agassiz, and Allman had brought to light and systematized a vast mass of information with regard to these organisms, the later observations of Claus, the Hertwigs, Haeckel, and Metschnikoff, have corrected, extended, and added to their history, especially in respect of embryological and histological detail.

The *Hydrozoa* present a greater simplicity of ultimate structure than do any animal organisms possessed of as great a complexity of external form. As in all *Metazoa* or *Enterozoa*, the life cycle of a hydrozoon starts with an egg which is at first a single cell or unit of protoplasm, but proceeds after fertilization to multiply by transverse fission in such a way that the resulting cells or units are arranged in two layers, each one cell deep, disposed around a central cavity—the enteron or archenteron. The sac thus formed is known as a diblastula. By the formation of a mouth to the sac, the enteron acquires the functions of a digestive retort in which food matters taken in at the mouth are brought into a chemical condition suitable for the nutrition of the surrounding cells. The two layers of cells (of which the outer only acquires additional layers by the division of the primary cells, and that by no means in all cases) received from Allman the names respectively of the ectoderm and the endoderm, having previously been shown by Huxley (1849) to be the fundamental membranous constituents of which the most varied parts of the more complex *Hydrozoa*—such as tentacles, swimming bells, and air-bladders—are built up in the adult condition. Huxley also pointed out the identity of these membranes with the two primary layers of the vertebrate embryo. The endoderm and the ectoderm, which present themselves, as is now known, in the diblastula (or gastrula) phase of all *Enterozoa*, remain in *Hydrozoa* (and also in the allied groups of *Cœlentera*) as permanently distinguishable elements of structure. This important disposition is associated with and dependent on the simple character which the archenteron or primitive digestive space retains. Into whatever lobes or processes the sac-like body may be, so to speak, molded, whether tentacles or broader expansions, into these the cavity of the archenteron is extended in the first instance; and where the actual cavity is obliterated the endodermic cell-layer remains to represent it.

Conversely, whatever canals or spaces are discovered in the substance of a hydrozoon (excepting only the cavity of ectodermal otocysts) are simple and direct continuations of the one original enteric cavity of the diblastula, and all such spaces are permanently in free communication with one another.

The whole of the *Hydrozoa* seem to present a lower grade of structure than the *Actinozoa*, in so far as the latter, while retaining permanently free communication between all parts of the archenteric space, yet exhibit a differentiation of this space into an axial and periaxial portion—a digestive tube and a body cavity. The differentiation has only to proceed a step further, namely, to the closure or shutting off of the axial from the periaxial portion of the archenteric space, and we obtain the condition which characterizes the adult forms of the *Cœlomata*, or animals with blood-lymph space distinct from digestive canal. With the attainment of the cœlomate condition, the two fundamental cell-layers, ectoderm and endoderm, which still appear in the embryo, become so far interwoven, and their products so highly differentiated, that it is no longer possible to recognize them as anatomical structures in the adult.

The only deep-seated distinction between *Hydrozoa* and *Anthozoa* (the *Actinozoa* being thus termed when the *Ctenophora* are detached from them) appears to be the particular differentiation of the archenteric space in *Anthozoa* which has just been noted. The diblastula derived from the egg of a hydrozoon, when provided with a mouth, may be spoken of (as are the equivalent forms in other animal groups) as a person. Either this person elongates and develops tentacles in a circlet around or near the mouth, and usually becomes fixed by the aboral pole of the sac-like body, or the sac gradually assumes the form of a clapper-bell or of an umbrella with greatly thickened handle, the mouth being placed at the free end of the handle or of the clapper, and the animal freely swimming by the contractions and expansions of the dome of the bell (disk of the umbrella). The two forms of persons are known—the former as the "hydriform," the latter as the "medusiform." The hydriform persons usually occur as fixed branching colonies or trees, produced by lateral budding from an original hydra-form developed from a diblastula.

The hydriform person in its most fully developed state is seen in the colonies of *Tubularia*. In such a colony a number of hydriform persons are united like the flowers of a plant on its branches (whence Allman's terms hydranth, hydrophyton).

The ectoderm or outer cell-layer furnishes the protective and contractile tissues of the hydra-form. Very usually it is not more than one or two cells deep, and is separated from the endoderm by a structureless lamella of firm consistence. In *Hydra* large cells of the ectoderm (neuro-muscular cells of Kleinenberg) bound the external surface and give off horizontal muscular processes which lie side by side on the structureless lamella—forming thus a deep muscular coat, the fibrous elements of which are not independent cells. In larger species some of the fibers may become separated from the tegumentary or superficial cells, and acquire the character of independent nucleated corpuscles (*Hydractinai*, Van Beneden). No nervous elements nor sense-organs occur in any hydra-form (except, perhaps, the *Lucernariæ*). In *Antennularia* some ectoderm cells are amœbiform, and project processes which change shape (nematophors).

The endoderm is usually but one cell deep, and lines the entire cavity of the body, starting from the margin of the mouth. In the region of the body proper, and in hollow tentacles, the cells are ciliated. In this region they are concerned in the secretion of digestive fluids and in absorption, and sometimes contain colored granules (hepatic?). Allman found in *Myriothela* that the endoderm cells project processes like the pseudopodia of *Protozoa*, and suggests that solid food particles are incepted by them. In the solid tentacles the endodermal cells are greatly modified, forming a kind of skeletal tissue, each cell recalling by its vacuolation and firm cell-wall the characters of vegetable parenchyma. In the stems of *Siphonophora* endoderm cells give origin to muscular processes like those of the ectoderm. This latter fact has a morphological significance which cannot be too gravely estimated.

Generative products are not developed by any hydriform persons (excepting the *Lucernariæ*), the sexual process being carried on by a distinct set of buds developed on the sides of hydriform persons. These buds either become medusiform persons, or are degenerated representatives of such persons (sporosacs). Even the freshwater *Hydra* does not appear to be an exception to this generalization. The single egg-cell of *Hydra* projects at the breeding season in an ectodermal covering, as a wart, from the lower part of the body. A conical eminence or two nearer the mouth contains the spermatozoa. Each ovarium and each spermarium represents an aborted generative person. According to Kleinenberg the egg-cell and the sperm-cells are both derived from the ectoderm. The *Lucernariæ* develop internal generative organs which correspond closely with those of the medusiform persons of the group *Scyphomedusæ* (see below), with which they are classified. Both ova and testis are endodermal in origin in *Lucernaria* and in the medusiform persons of the *Scyphomedusæ*, while they appear to be ectodermal in origin in the complete medusiform persons of *Hydromedusæ*, though in the degenerate medusiform persons known as sporosacs they may either or both have an endodermal origin.

The nervous system has only recently been correctly recognized in medusæ, though seen by Agassiz as long ago as 1849, and described both by Fritz Müller and Haeckel in certain forms (*Geryonidæ*) more recently (1860). It differs remarkably in the two great groups into which the *Hydrozoa* are divisible. In the *Scyphomedusæ* there is no continuous nerve-center, but around and about each tentaculocyst nerve-fibers and cells are grouped in such a way as to divide the disk into zones of nerve supply corresponding to the number of tentaculocysts (usually eight). Both the Hertwigs and Eimer entirely missed in their researches the large nerve-fibers and prominent ganglion cells which were discovered by Professor Schäfer of University College, London, in the *Scyphomedusæ*. Professor Claus, of Vienna, has independently described (*Polypen und Quallen der Adria*, 1878) similar nerve-cells and fibers in *Chrysaora* and *Charybdæa*.

The building up of complex individualities, such as a hydrozoon colony, a flowering plant, or a segmented worm or arthropod—in any one of which a number of common units are repeated, but with varied form and function in each part of the compound body—is generally admitted to be explicable in two ways, and which of the two explanations may be adopted in any one case must depend on the ultimate inference from a wide series of observations. The first hypothesis, which undoubtedly applies to the ordinary hydriform colonies of *Hydrozoa*, to the segments of *Tænia*, and to plants formed by the repetition of phyllomes, is that an original unit like those which constitute the composite organism has freely budded, and repeated its own structure in the well-marked units which remain conjoined to form an aborescent or linear aggregate. This is "eumerogenesis," and such aggregates may be termed eumeristic. By a division of labor and consequent modification of form among the units of a eumeristic aggregate, such an aggregate may (in the course of phylogeny) acquire varied shape and definite grouping of its constituent units, and a high specialization as an individual. The high degree of individuation which may be thus attained is due to the more or less complete synthesis of a eumeristic colony. The more highly individuated Chætopods and Arthropods are synthesized linear colonies. The cyclosystems of the *Hydrocorallinæ* are undoubted examples of synthesized colonies. The second hypothesis is one which is applicable to cases which, in the absence of special evidence to the contrary, might be regarded as highly synthesized colonies.

HYDRUNTUM. See OTRANTO.

HYÈRES, a town of France, in the department of Var and arrondissement of Toulon, about three miles from the coast of the Mediterranean. It is connected by a branch line with the railway from Toulon to Cannes, and by diligences with the neighboring towns. Population about 10,000.

HYGIENE is the science, PRACTICAL HYGIENE the art, of preserving health. The name has been adopted from the French, from which language it has also been introduced into most other tongues; it is derived from the Greek word meaning health. Writings on health are among the oldest in the world, for the subject has engaged the attention of the profoundest thinkers and most renowned leaders of men. We have only to point to the elaborate directions in the Mosaic laws for the preservation of health through scrupulous attention to cleanliness, the isolation of the sick, and extreme care in the use of wholesome articles of food and drink. Throughout the whole of their history the Jews enjoyed a remarkable immunity from epidemic disease, the most of the instances in which such disease occurred being represented as those in which they departed from the law and doubtless relaxed the wholesome vigilance enjoined by it. In mediæval and modern history they have often, even down to our own time, been spared the ravages of epidemics, when their Christian neighbors were perishing around them. Ignorant superstition often gave rise to the idea that they had poisoned the wells, and they fell victims to the fanaticism of the times. It is highly probable that the periodical cleansing of their dwellings, involved in the thorough search for the leaven which preceded the yearly passover (*Mishna*, Pesachim, i. 11), had a notable influence in preventing that continuous deposition of organic matter, which is no doubt one most powerful factor in the production of zymotic disease. On the other hand the filthy habits of the Christian populations offered a premium to plagues of every kind; for there is no parallel in ancient history to the terrible invasions of disease which from time to time ravaged Europe down to quite recent times.

It is the province of hygiene to seek out and determine the causes of disease, and to formulate rules for their prevention and removal. It may thus be called also preventive medicine, although this term does not quite express all that must be included. The progress of hygiene, such as it was, rested for many ages upon an empirical basis, and indeed to a large extent this is still the case. The subject has, however, in later times at least, been studied to considerable advantage, although much remains to be done. Two centuries ago the mortality of London was 80 per 1,000—at the present day it is under 23. A century ago ships could barely keep the sea for scurvy, while jails and hospitals were in many cases the hotbeds of fatal disease; now those conditions are rectified, or at least the means of rectifying them are known. Thirty years ago the English troops at home died at the rate of 20 per 1,000—now their death-rate is less than one-half of this. A knowledge of the causes and modes of propagation of disease being necessary in order to provide rules for its prevention, it is obvious that hygiene must be largely dependent upon the advances made in pathology and ætiology; hence the impossibility of any very marked progress in former times, by reason of the imperfection of the collateral sciences, and the want of the appliances more recently made available for inquiries of such a difficult and recondite character. Within this century, however, and especially within the last forty or fifty years, it has been possible to follow out the subject on a more strictly scientific basis, and so to lay a foundation, at least, on which to build a structure, which may one day entitle hygiene to a place among the more exact sciences.

The special subjects which hygiene embraces are the following:—I. Those which concern the surroundings of man; such as meteorological conditions, roughly included under the head of climate; the site or soil on which his dwelling is placed; the character, materials, and arrangements of his dwelling; the air he breathes; the cleansing of his dwelling, and the arrangements for the removal therefrom of the excreta and other effete matters.

II. Those which concern the personal care of health; such as the food he eats and the water and other beverages he drinks; clothing; work and exercise; personal cleanliness; special habits, such as the use of tobacco, narcotics, etc.; control of sexual and other passions.

III. Certain points not directly included in the above; such as the management of infancy; the prevention of disease; the hygiene of the sick-chamber; and the disposal of the dead.

It is obvious that it is impossible to draw any hard and fast line in these divisions, and that they must constantly run into and overlap each other.

1. *Meteorological* or (so-called) *climatic* conditions. Here temperature and humidity are the two points that obviously present themselves for consideration, but it is very difficult indeed to separate their influence from those of soil or site. It is also certain that much that has been attributed to climate is really due to other causes. It may be laid down as a general principle that, if moderate care be taken, man may preserve his health in almost any part of the world, although it must be admitted that in some places, such as hot and moist climates, disease causes appear to be more easily called into action than under colder or drier conditions. Some diseases, such as yellow fever, appear to require a certain temperature for their development and propagation; others, such as enteric (commonly called "typhoid") fever, appear to exist indiscriminately under any meteorological conditions; others, such as cholera, although undoubtedly originating in hot and moist countries, appear capable of being propagated in most parts of the world. In some cases great heat and dryness arrest disease, as used to be observed in Egypt, where the plague was commonly said to cease after St. John's day. During the hot harmattan wind of the west coast of Africa small-pox is arrested, and successful vaccination becomes impossible. To the sick or delicate, meteorological conditions are of great importance, but this part of the subject belongs more to the treatment of disease than to general hygiene. To the healthy, meteorological conditions, however much they may affect personal comfort, are of comparatively little moment as regards health, so long as reasonable care is observed. In a

healthy body an adaptation to circumstances rapidly takes place, and an equilibrium is soon established. Thus, it used to be supposed that great heat increased the temperature of the body, but later observations have shown this to be erroneous, and that the balance is soon reëstablished by the process of transpiration; should this, however, be arrested, then a rise of temperature may take place, and disease of a febrile character be established.

2. The *soil* or *site* of the dwelling is, however, of greater moment, and much that has been attributed to climate has been more truly due to locality. Soils are generally divided into moist and dry, permeable and impermeable, and again subdivided according to formation, composition, slope, etc. Healthy soils are those which are dry and permeable, or which have such a slope as renders drainage easy; on the other hand, soils which are flat, moist, and impermeable are generally unhealthy. Soils containing much organic matter are to be avoided, such as alluvial soils generally, as well as all marshy districts. The air in soils is generally more or less impure, hence the unadvisability of occupying dwellings below the ground level or situated immediately on its surface. The water in the soil is a question of great importance, apart from the mere moisture. At varying distances from the surface, but everywhere, there exists a great subterranean lake or sea, known as the *ground-water* or *water-table*, which is constantly in motion, both vertically and horizontally. Its horizontal movement is toward the nearest watercourse or toward the sea; its vertical movement is determined by rainfall chiefly. Much importance has been attached to it, and the following points may be considered as accepted by most hygienists:—(1) A permanently high ground-water, that is, within five feet of the surface, is bad, while a permanently low ground-water, that is, more than fifteen feet from the surface, is good; and (2) violent fluctuations are bad, even with an average low ground-water; a comparatively high ground-water with moderate and slow fluctuations may be healthy. According to the school of Pettenkofer, it is the ground-water which determines the spread of certain forms of disease, such as cholera and enteric fever. A previously high level, succeeded by a fall, with a certain height of temperature in the soil-air, is the condition believed by them to be the one most favorable for disease production. Healthy soils are the granites, metamorphic rocks, clay-slate, limestone, sandstone, chalk, gravel, and sand; unhealthy are—clay, sand, and gravel with clay subsoil, alluvial soil, and marsh-lands, with the exception of peatlands. Among the unhealthy soils ought also to be included all "made" soils, particularly those that are formed so often in towns from rubbish of all sorts. Such soils ought not to be occupied as building sites for at least two years.

3. The sanitation of *dwellings* involves numerous points. The site has been considered in the previous section, but the importance of excluding soil emanations must be insisted upon. The placing of a dwelling in any spot of ground tends to exert an extractive force upon the soil, because the air of the dwelling is almost always warmer than the external air, and there is therefore a constant danger of sucking up the more or less impure soil-air into the dwelling. Not only is this a recognized source of disease, but fatal cases of direct poisoning have sometimes resulted, as when coal-gas has escaped into the soil below or near a dwelling. An impervious foundation is therefore necessary, although this precaution is too often neglected, even in high-class dwellings. Houses ought to be so arranged that they may receive plenty of light, not merely for work or convenience, but as a matter of health. Sunlight, for full health, is as necessary as air, and this is now so strongly recognized in America that in many of the hospitals in that country rooms are provided where patients may take a "sun-bath."

The materials of which houses are built are various. Wooden dwellings have advantages, but there is always the danger of fire. Brick or stone is most commonly used, but very good dwellings may be made of concrete or even of mud. Probably the best material is good, sound, well-burnt brick. Dryness must be secured by means of damp-proof courses along the foundations, hollow walls, and cementing or slate-hanging externally. Non-absorbent surfaces internally are important, although some writers, such as Pettenkofer, etc., have been inclined to attribute the unhealthiness of dwellings to the impermeability of the walls obstructing air change. But where air can pass, organic matter can lodge and become a source of danger. It is better, therefore, to have non-absorbent surfaces as much as possible, and to provide for ventilation in other ways. Paint that can be washed is therefore better than paper; if the latter is used it had better be glazed. Care should be taken to scrape off all old papers beneath, as they and the paste used with them tend to decompose and become injurious to health. Ceilings ought to be impervious as well as walls, and floors ought to be made of well-fitting seasoned wood, calked, and oiled or varnished so as to make them water-tight.

Proper cubic space is a matter of great importance, for upon it depends the renewal of air. The air of an air-space can seldom be changed oftener than three times an hour, hence the space ought to be large enough to allow of such rate of change providing enough of air for respiratory purposes. The furniture of rooms, especially sleeping-rooms, ought not to be too massive; while curtains and hangings too often form traps for dust and organic matter.

The warming of houses is important, and is generally badly and wastefully done. The open fireplace has great advantages, but it is in many cases insufficient. Where any general system is employed it is better to warm the air in the room itself, as by pipes conveying hot water or steam, than to warm it before delivery. Overheated rooms are a source of ill-health. For sitting-rooms 60° to 65° is quite enough; for a study or work-room 60° is sufficient, even in some cases less than this. A sleeping-room need never be above 60°, often with advantage below it. Fresh air ought not to be sacrificed to temperature, except under extreme circumstances. Dwellings should not be occupied for some time after building, till they are thoroughly dry. Rheumatism, chest diseases, etc., are very apt to arise from neglect of this precaution.

Scrupulous attention to cleanliness is necessary in dwellings, and there is wisdom in their periodical vacation for a certain time, so as to let them lie fallow, as it were, and interrupt the continuity of deposit of organic matter. Dwellings ought to be scattered over as wide an area as possible, for statistics show that sickness and death-rate are often inversely proportioned to the amount of area per head occupied by a community. The area per head in London is estimated at double that of Paris and many other cities, while at the same time its death-rate is smaller than that of any other large city in Europe.

4. *Air* is the prime necessity of life. Food or water may be abstained from for a considerable time, and we may thus have an opportunity of replacing either should we doubt its purity or wholesomeness, but the atmosphere around us we must breathe or die. Hence the paramount necessity for having it pure. But, although this is apparently so obvious, attention to its impor-

tance has been very generally omitted. Air consists of a mechanical mixture of oxygen and nitrogen, in the proportion of nearly 21 per cent. of the former to 79 of the latter, with small quantities in addition of carbonic acid, moisture, organic matter, etc. By respiration and combustion air becomes vitiated, the oxygen diminishing and the carbonic acid and organic and suspended matter increasing. Within certain limits the amount of carbonic acid is in itself immaterial to health, but it is important as a measure of the amount of organic matter, which is really the dangerous impurity. Air vitiated by respiration is also much more dangerous than when the carbonic acid is partly the result of combustion. It is now pretty generally admitted that air cannot be considered as really good and fit for respiration in which the respiratory impurity reckoned as carbonic acid much exceeds two parts in 10,000 by volume. On the other hand, if air can be kept down to this point, the condition may be looked upon as satisfactory. The amount of impurity given off by living beings varies of course with size, weight, age, sex and work, but it may be allowed that under ordinary circumstances it amounts to about six cubic feet of carbonic acid per head in ten hours during repose. This requires an hourly supply per head of 3,000 cubic feet of fresh air for its dilution, and this amount should be largely increased during work or in sickness (see HOSPITAL). The diseases which have been shown to arise from the effects of vitiated air are widely prevalent, including such as consumption and other forms of scrofulous disorders, bronchitis and pneumonia, sore throat, etc. Crowded and ill-ventilated places also tend to increase the virulence and the rapidity of spread of the various communicable diseases.

5. *Cleansing*, including the removal of slops, excreta, etc., forms one of the most important and also most difficult of questions. The main principle is that all should be immediately and effectually removed from the house and its neighborhood, and that there should be no possibility of reflux of foul air from drain or cesspool. The system of water-carriage is certainly the cleanest and most convenient, especially among large communities, but other systems find advocates. In villages and isolated houses the earth system and other dry methods have many advantages. The question of the disposal of sewage is a very large one, into which it is impossible to enter here. Hitherto all or almost all the material has been wasted by being poured into rivers or the sea, the streams being thus polluted and the shores rendered offensive. The object to be aimed at is to utilize a product of undoubted fertilizing influence, without endangering the health of the community. The diseases to be apprehended from imperfect methods of sewage removal are enteric fever, cholera, diphtheria, sore throat, and an aggravation of most other diseases, especially those of an eruptive character. Ashpits ought to be especially attended to, their neglect being attended with much danger.

6. *Water supply*, although included under the head of food and beverages, merits special consideration, so important is its relation to health, both directly as a drink and indirectly with reference to its many other uses. It is required for drinking, cooking, the cleansing of person, clothes and dwelling, and the flushing of closets, sewers and drains. The hygienic requirements are that water should be good in quality and sufficient in quantity. Good water should be clear, colorless, quite free from suspended matter, of a good luster, and should have a pleasant sparkling taste, the latter qualities being due to the carbonic acid and atmospheric air dissolved in it. In its chemical composition it ought to be as free as possible from organic matter. The evidence in favor of communication of disease by means of drinking water is now very extensive, and we may cite diarrhœa, dysentery, ague, enteric fever and cholera as among the diseases which may be conveyed through this channel. Numerous parasites also find their way into the human body by this means. Hard water is objectionable for cooking and washing, nor can it be recommended for drinking, although some insist upon a certain amount of hardness being essential. In the case of water being impure, boiling, distilling or filtering may be resorted to. The two former are the most efficacious, but the last has advantages of convenience if properly carried out. Charcoal filters, if properly cleansed or renewed sufficiently often, are useful; but it is better to have a material that purifies without risking any deterioration of the water itself. Such filters as the spongy iron and the carferal effect this. All filters, however, require the medium to be cleansed or renewed periodically. In a house the chief dangers are from dirty cisterns and from pipes being connected with drains and closets. All supply should be on the constant system, and no pipe supplying a closet should be resorted to for drinking purposes. All overflow pipes should deliver in the open air. The quantity of water required per head may be stated at a minimum of twelve to sixteen gallons per diem where there is no general system of drainage, and about twenty-five gallons with drainage. In towns more than this is necessary, and from thirty to fifty gallons are desirable. In sickness generally double the amount is necessary that is required in health. The source of the water ought to be pure—springs, deep wells and upland surface water being the best. Shallow wells and rivers to which sewage gains access are most to be avoided.

7. For *food and beverages* the reader is referred to the article DIETETICS.

8. *Work and Exercise.*—The kinds of work performed by man are, of course, very various, but they may be reduced more or less to a uniform standard, which is usually reckoned as so many tons (or pounds) raised through one foot, or, tersely, as foot-tons or ton-feet. A fair day's work is generally taken at 300 foot-tons, a laborious day's work at 450, and the maximum to be expected, except under very special conditions, at 600. For this work a certain time should be allowed, as the strain increases (almost in a geometrical ratio) with the velocity. Usually speaking, fifty foot-tons an hour is a fair amount, and this ratio is equal to a walk of three miles for an average man. The amount for mental work has not been accurately calculated, but it may be safely assumed that a man of sedentary occupation ought to take exercise of a physical kind varying from 50 to 100 foot-tons per diem. In all cases his food ought to be proportioned to his work, for it is now recognized that man is a machine, whose work depends upon the energy derived from the food he eats.

9. *Clothing and Personal Cleanliness.*—Clothing should fulfill the functions of preserving warmth in cold weather, providing covering without being too oppressive in hot weather, keeping out wet in wet weather, and yet allowing sufficient transpiration for health. At the same time it ought to admit of frequent change and cleansing. Doctor Parkes has pointed out that it is probably due in some measure to cleaner habits with reference to clothing that the diminution of typhus fever should have been so marked in recent times. Personal cleanliness is also a matter of great importance, a daily general bath being advisable for everyone. For animals as well as human beings it has been shown that cleanliness is conducive to improved appetite and general health. Filth is one of the prime factors in the

production and propagation of most of the devastating plagues known to mankind.

10. *Prevention of Disease.*—This is a large question, on which we can only briefly touch. Much depends upon our knowledge of etiology or the remote causes of disease. The best rule for preventing disease is to follow out carefully the principles of general hygiene, laid down with reference to pure air, pure water, proper food, cleanliness, etc. Some diseases may be more specially provided against, such as paroxysmal fevers by the use of quinine, and small-pox by vaccination, but for the great majority of diseases no such special preventive is known. Some diseases, such as typhus fever and plague, are successfully combated by scattering the population over a large area and inducing the freest ventilation, and to all diseases this plan may be applied with more or less effect. In those diseases which are known to be communicable, such as scarlet fever, isolation of the patients is an effectual means of arresting the spread; but the poisons of others, such as measles and hooping-cough, are so subtle that isolation can only be looked upon as a measure of doubtful success. Much stress has been laid upon *disinfection* as a means of preventing disease, and if properly carried out it has some efficacy. But it is a mistake to place too implicit reliance upon it as ordinarily practiced. In dealing with clothing, bedding, etc., the best method is the application of heat, at or above the boiling-point of water, which may be done by means of dry heat, superheated steam, or boiling water. In fumigating places, burning sulphur or the vapor of chlorine or nitrous acid is used, but to be effectual the air must be rendered for the time irrespirable. The solid and liquid disinfectants (so-called) are chloride of lime, the permanganates, carbolic acid, and a great many similar substances, many of which have been made the subjects of patents. A large number of them are merely deodorants. It may be stated generally that disinfectants are useful as adjuncts to other hygienic measures, but that they cannot replace them, except to a small extent, and in a very imperfect way.

11. *Disposal of the Dead.*—The most frequent plan is interment in the earth, but it may well be a question if this be the best plan; it has certainly led to much evil when carried out near habitations. Two other plans have been suggested, viz., burial at sea (suggested by the late Doctor Parkes) and cremation. The former is hardly likely to be resorted to, but the latter would be effectual in preventing the evil consequences of ordinary interment. At the same time the danger that it might too effectually conceal much secret crime has to be taken into account.

HYGINUS, Caius Julius, a native of Spain, and the freedman of Augustus, by whom he was made chief of the Palatine library. He is said to have fallen into great poverty in his old age, and to have been supported by one C. Licinius. He was a voluminous author, and his works included topographical and biographical treatises, commentaries on Cinna and on Virgil, and disquisitions on agriculture, bee-keeping, and the military art. All of these are lost. But there have come down under his name two school treatises on mythology, which have produced much discussion.

HYGINUS (surnamed Gromaticus, from *gruma*, a surveyor's measuring rod), a writer on land surveying and castrametation, who flourished in the reign of Trajan, (98–117 A.D.)

HYGROMETRY. A large number of substances, such as sugar, flour, and bread, possess the property of absorbing moisture, and most gases, as well as air, absorb and retain aqueous vapor. The term *hygrometry* is employed to signify the measurement of the degree of dampness of substances, and to denote the processes by which their humidity is ascertained. The term, however, may be considered as restricted to the humidity of the atmosphere, owing to the paramount importance of that branch of the subject, and the slight and unsatisfactory knowledge we yet possess of the laws of hygrometry of other substances.

All organic substances contain pores for the conveyance of their juices, and are influenced by the accession of moisture, some of them very markedly so. Every species of wood is liable to these hygrometric changes, the amount of contraction and expansion being much greater across the grain of the wood then lengthways. Hence the panels of doors are fitted into grooves so as to allow of shrinkage, for, if secured at the edges, the panels must inevitably split. The hair of animals is also eminently hygrometric, curling and uncurling as the air becomes drier or moister, and it is because of the peculiar sensations accompanying these hygrometric changes that the cries and behavior of many of the lower animals furnish valuable prognostications of weather changes. Similarly many manufactured objects, such as paper, cordage, etc., vary in weight, bulk, form, and elasticity with the varying degrees of humidity of the air, and other interesting prognostics have been drawn from these hygrometric changes.

In the earlier stages of the investigation of the hygrometry of the air, the hygrometric properties of several substances were made use of as instruments of observation. Of these may be named the twisted Indian grass (*Oobeena Hooloo*), employed by Captain Kater on account of its remarkable property of twisting and untwisting according to the dampness of the air; a slip of whalebone cut across the fibers, used by De Luc; and the hygrometer of Saussure, which was formed of a hair from which the oily matter had been previously removed, and which stretches when moist and contracts when dry. Experience has, however, shown that none of these hygrometers are satisfactory instruments, since they give inconsistent results, and are liable when in use to great and uncertain changes. Hence, while they serve to give the roughest idea of the state of the air as regards moisture, they have fallen into disuse as accurate instruments of observation of the hygrometry of the atmosphere. But in the intensely cold climates of Russia and Siberia, the hair hygrometer still continues to be used as an instrument of observation; and when we consider the tediousness and difficulty of making hygrometric observations with the hygrometer in most general use when the temperature of the air descends below the freezing point of water, the hair hygrometer should perhaps be considered as good an instrument as is available to put into the hands of ordinary observers in times of low temperature.

The most accurate hygrometers are those which are constructed, not as the above, on the principle of absorption of vapor, but on the principles of condensation or evaporation. The well-known fact that the temperature of a wet body is lower than that of a dry one when under the same atmospheric conditions was applied by Sir John Leslie to measure the humidity of the air. Leslie's hygrometer, which is an adaptation of his differential thermometer, is formed by uniting two tubes having a ball blown on the end of each, into which some colored sulphuric ether has been previously introduced. When both bulbs are at the same temperature, the fluid stands at the zero of the scale, but when one of them is covered with wetted paper or muslin the instrument shows the depression of temperature of the wetted bulb. In order to ascertain the quantity of moisture corresponding to the reading of a Leslie's hygrometer, we must deduct from the total quantity of moisture which the air of the temperature at the time of observation is capable of holding the deficiency due to the degree of cooling shown by the hygrometer.

As no air is ever absolutely dry, but contains more or less moisture, it is evident that if any mass of air be cooled sufficiently it may be made to deposit its moisture. A familiar example of the condensation of vapor is seen in the formation of dew on a tumbler filled with cold water and brought into a warm room. This dew is caused by the deposition of moisture from the air in contact with the cold surface of the glass, which is cooled down below the point of saturation. The temperature of the glass at the instant dew begins to form on its surface is termed the dew-point, which corresponds with the point of saturation of the air.

Daniell's hygrometer consists of a glass tube bent at right angles at two points with a bulb at each extremity, one bulb being of black and the other of clear glass, the latter covered with muslin. The liquid within the bulbs is ether, which at the time of being sealed is made to boil for the purpose of expelling the air. If the temperature of the two bulbs be made to differ from each other, all the ether is transferred from the warmer to the colder bulb. In making an observation the whole of the ether is first transferred to the black bulb, and ether is then dropped on the muslin covering outside the clear bulb. This ether quickly evaporates, and in doing so rapidly lowers the temperature of the clear bulb so that the ether inside the black bulb distils over into the clear bulb. The result is a lowering of the temperature of the black bulb, and, as soon as this falls to the temperature of the dew-point of the air where the experiment is conducted, a ring of vapor begins to be formed outside the black bulb, more or less dulling its surface. At this instant a thermometer placed inside the tube with its bulb immersed in the ether filling the black bulb is read, and the reading gives the dew-point of the air at the time.

Regnault's hygrometer is a little more complicated than Daniell's, but its indications are much more trustworthy. It consists of a glass tube or capsule having on the bottom and a little way up a highly polished silver surface, and closed by a cork with two holes. Through one of these holes the stem of a thermometer passes, having its bulb at the bottom of the silvered capsule, while through the other hole passes a narrow metallic tube, one end of which opens close to the bottom of the capsule, and the other end may, if desired, be connected with an aspirator or air-pump. In making an observation as much ether is introduced into the capsule as will cover the bulb of the thermometer, and then by transmitting air through the tube the ether vapor is withdrawn from the capsule through another tube. By this means the temperature of the ether is very rapidly reduced, and since the whole mass of the ether is agitated by the air-bubbles which rise through it from the bottom of the capsule, the cooling of the ether is equal throughout. The thermometer is then read quickly, but to insure an accuracy to the tenth of a degree a second and a third experiment, conducted more slowly, should be made. As showing the rapidity with which observations can be made with this hygrometer, Henry F. Blanford on one occasion made six observations in six minutes in the dry climate of Secunderabad, when the temperature of the air was 93°, the dew-point 51°, and the relative humidity consequently 24°. The temperature of the air at the time of observation may be ascertained in the usual way, or by means of the thermometer if care be taken that its temperature is unaffected by the proximity of the person of the observer.

Owing to the expense and great trouble attending the use of hygrometers which give the dew-point directly by condensation, another hygrometer has come into extensive use by which the dew-point is determined indirectly by evaporation. This is August's hygrometer, sometimes called Mason's hygrometer, but more generally known as the dry and wet bulb hygrometer, which has the strong recommendation of being self-acting, and requiring only the readings of the two thermometers in making air observations.

HYMEN, or HYMENÆUS, was originally the name of the song sung at marriages among the Greeks. As usual the name gradually produced the idea of an actual person whose adventures gave rise to the custom of this song. He occurs often in association with Linus and Ialemus, who represent similar personifications, and is generally called a son of Apollo and a Muse. In Attic legend he was a beautiful youth who, being in love with a girl, followed her in a procession to Eleusis disguised as a woman, and saved the whole band from pirates. As reward he obtained the girl in marriage, and his happy married life caused him ever afterward to be invoked in marriage songs. At other times the tale is of an opposite character; Hymen was unfortunate either by dying on his marriage day or in some other way, and he was invoked to propitiate him and avert a similar fate. He occurs often in the train of Aphrodite, along with Eros, Himerus, Pothus, etc.

HYMENOPTERA, an order of *Insecta* (so named from their wings being joined), containing the insects commonly called bees, wasps, ants, ichneumons, gall-flies, saw-flies, and others less known which have received no English names. The main characteristics of the order are these: The possession of four wings, of which the anterior are always larger than the posterior, always of the same texture, and mostly with nervures arranged in regular patterns; a dense, hard skin, smooth, shining, or very hairy; a mouth always provided with mandibles adapted for biting, though the other mouth parts may be so modified as to serve for mastication, or for the sucking, or rather lapping, of liquids. The female is provided with an anal instrument connected with oviposition, and sometimes serving for defense, in which case it is in communication with a poison gland. They undergo a regular transformation, and have larvæ provided with legs on the thorax and abdomen, or on the former part only, or (as is more often the case) entirely footless.

Hymenopterous insects procreate by the union of the two sexes. This takes place usually in the sunshine. Sometimes the connection does not last more than a few seconds, and is not preceded by any preliminary courting. On the other hand many bees remain united for hours, and the genital parts of the male get torn and ruptured, so that it dies immediately after. Some species of *Chalcididæ* have been observed coquetting together for more than an hour before uniting. Generally copulation takes place on the ground; but a few forms pair on the wing. The male *Anthophora*, for instance, carries the female with him into the air for the marriage flight. This is the reason why the male *Anthophora* is larger than the female, instead of being smaller, as is usually the case.

While, as has been said, *Hymenoptera* reproduce by the union of the two sexes, yet parthenogenesis or virgin reproduction is of not uncommon occurrence, and has been observed in all the families whose development for more than one generation can be traced with sufficient facility and accuracy. We meet with this phenomenon under (broadly speaking) two or three phases. Many females, if they cannot get access to males, will readily lay eggs, which are fertile and give issue to larvæ; but these larvæ, when they reach maturity, yield invariably males. Anyone can test this for himself with the too common gooseberry grub, *Nematus ribesii*. The same thing occurs with wasps, ants, and bees. With saw-flies, again, there are some species whose males are quite unknown, although the species have been caught and bred from the larvæ in hundreds, *e.g.*, *Eriocampa ovata*. Others have males, but they are extremely rare, *e.g.*, *Nematus gallicola*. It has been shown, too, that the species just mentioned and some others (*Phyllotoma nemorata*, *Pœcilosoma pulveratum*, etc.) with males unknown readily lay fertile eggs. The queen bee can lay eggs which will produce males or females, by opening or closing the spermatic sac, and letting the eggs come in contact or not with the spermatic fluid. In the former case females will be the result, in the latter males. Worker bees, wasps and ants deposit eggs which produce, however, only males. A still more curious phenomenon in connection with the reproduction of some gall-insects (*Cynipidæ*) requires to be mentioned. In early spring will be found on oak leaves and flowers soft, juicy, greenish, globular pea-shaped galls. Out of these come in summer the gall-flies represented by both sexes. In the autumn (also on oak leaves) are found those curious flat, brownish galls commonly called "oak spangles," which by many are taken for fungi, and have indeed been described as such. These "spangle galls" retain very much the same form during the autumn and winter; then in March they swell up and become juicy, and a larva makes its appearance; this soon becomes a pupa and finally a fly, but only in one sex, the female. It was long supposed that these two insects had no relationship with each other, that they belonged in fact to two distinct genera, for not only did the galls differ, but the insects themselves differed in the form of the body, the wings, etc. But it has recently been shown by Doctor Adler that the two are forms of the same species, that there is an alternation of a spring bisexual form, with an autumnal unisexual one.

A dimorphism of another kind exists among the social bees, wasps, and ants. An ordinary colony of these insects consists of three sorts of individuals. There is the large female which founded the colony; then there are the workers or neuters, undeveloped females on whom the work of the colony depends; and lastly, there are the males. It is with ants that the workers are most profoundly modified. They are wingless, and there may be in a colony several sorts, each kind performing different duties, and having the body modified in accordance with the work it has to do. Those which act as soldiers (when a special kind is set apart for this work), for instance, have the mandibles enormously developed; another set may secrete honey for the benefit of the others, etc.

The *Hymenoptera* must be regarded as one of the most beneficial and useful to man of the insect orders. The produce of the hive-bee—wax and honey—has been employed by man since the earliest ages, and forms an extensive article of commerce. The curious structures raised by *Cynipidæ* on the oaks of eastern Europe —galls—have long been used in the manufacture of ink. But, whatever the bee may have done in contributing to our luxuries, and the gall-fly in rendering easier the advance of knowledge, these are small benefits compared to the indirect advantages we derive from the labors of the parasitic species through the havoc they make among the insects which devour the produce of our fields and gardens, and too often destroy the labors of the farmer and gardener. When we remember that there are vast numbers of insects which destroy plants; that many of these are so minute and obscure in their mode of life as to escape ordinary observation, save when the injury is done; and that others appear in enormous numbers, it becomes evident that an insect which causes the death of a single caterpillar does good service, since that caterpillar would have (if left undisturbed) given, in all probability, origin to an imago which might give birth to hundreds of others. It is this which the ichneumons do—they destroy the larvæ of plant-devouring insects. Another division of *Hymenoptera* does equally good service. It has been shown by modern researches that without the aid of bees many flowers would never yield seed. Many plants cannot fertilize themselves, so that if bees did not carry the pollen from one plant to another, and thus effect fertilization, no seed would be produced. The red clover, for instance, would never produce seed if it were not for the humble bees fertilizing it in their visits in search of honey. It must, however, be confessed that some *Hymenoptera* do very considerable damage to vegetation, especially saw-flies and ants.

The *Hymenoptera* are almost exclusively dwellers on land, and are essentially sun-loving insects. Two or three only live an aquatic or quasi-aquatic mode of life.

Many *Hymenoptera* give origin to sounds. The humming of bees is one of the most familiar and delightful of country sounds. It is not yet quite clearly understood how it is caused, but there is evidence enough to show that the buzzing originates by the air impinging against the lips of the metathoracic and abdominal stigmas; although it is possible, too, that the rapid vibration of the wings (224 per second with the *Bombus muscorum* and 440 with the honey bee) may also have something to do with the production of sound, for a bee can give out differently pitched notes according to its mood, as it is pleased or angry. Besides the buzzing sounds, a few other species chirp by means of the abdominal segments.

HYMETTUS, a mountain (3368 feet) in Attica, now called Trelo Vouni, situated to the southeast of Athens, was famous among the ancients for its honey and its bluish marble. The honey is still in repute.

HYMNS. The word "hymn" was employed by the ancient Greeks to signify a song or poem composed in honor of gods, heroes, or famous men, or to be recited on some joyful, mournful, or solemn occasion. Polymnia was the name of their lyric muse. Hellenic hymns, according to this conception of them, have come down to us, some from a very early and others from a late period of Greek classical literature. Those which passed by the name of Homer were already old in the time of Thucydides. They are mythological poems (several of them long), in hexameter verse—some very interesting. The Romans did not adopt the word "hymn;" nor have we many Latin poems of the classical age to which it can properly be applied. For the origin and idea of Christian hymnody we must look, not to Gentile, but to Hebrew sources. St. Augustine's definition of a hymn, generally accepted by Christian antiquity, may be summed up in the words, "praise to God with song." Bede understood the "canticum" as properly requiring meter; though he thought that what in its original language was a true hymn might retain that character in an unmetrical translation. Modern use has enlarged the definition: Roman Catholic writers extend it to the praises of saints; and the word now comprehends rhythmical prose as well as verse, and prayer and spiritual meditation as well as praise.

The modern distinction between psalms and hymns is arbitrary (see PSALMS). The former word was used by the LXX. as a generic designation, probably because it implied an accompaniment by the psaltery (said by Eusebius to have been of very ancient use in the East) or other instruments. The cognate verb "psallere" has been constantly applied to hymns, both in the Eastern and in the Western Church; and the same compositions which they described generically as "psalms" were also called by the LXX. "odes" (*i.e.*, songs) and "hymns."

In the New Testament we find our Lord and His apostles singing a hymn, after the institution of the Lord's Supper; St. Paul and Silas doing the same in their prison at Philippi; St. James recommending psalm-singing, and St. Paul "psalms and hymns and spiritual songs." St. Paul also, in the fourteenth chapter of the first epistle to the Corinthians, speaks of singing, and of every man's psalm, in a context which plainly has reference to the assemblies of the Corinthian Christians for common worship. All the words thus used were applied by the LXX. to the Davidical psalms; it is therefore possible that these only may be intended, in the different places to which we have referred. But there are in St. Paul's epistles several passages which have so much of the form and character of later Oriental hymnody as to have been supposed by Michaelis and others to be extracts from original hymns of the Apostolic age. Two of them are apparently introduced as quotations, though not found elsewhere in the Scriptures. A third has not only rhythm, but rhyme. The thanksgiving prayer of the assembled disciples, recorded in Acts iv., is both in substance and in manner poetical; and in the canticles, "Magnificat," "Benedictus," etc., which manifestly followed the form and style of Hebrew poetry, hymns or songs, proper for liturgical use, have always been recognized by the church.

The hymn of our Lord, the precepts of the apostles, the angelic song at the nativity, and "Benedicite omnia opera," are referred to in a curious metrical prologue to the hymnary of the Mozarabic Breviary, as precedents for the practice of the Western Church. In this respect, however, the Western Church followed the Eastern, in which hymnody prevailed from the earliest times.

The early mediæval period, from the time of Gregory the Great to that of Hildebrand, was far from deficient in the production of good hymns, wherever learning flourished. Bede in England, and Paul "the Deacon"—the author of a fairly classical sapphic ode on St. John the Baptist—in Italy, were successful followers of the Ambrosian and Gregorian styles.

Another celebrated hymn, which belongs to the first mediæval period, is the "Veni Creator Spiritus" ("Come, Holy Ghost, our souls inspire"). The earliest recorded occasion of its use is that of a translation (898) of the relics of St. Marcellus, mentioned in the *Annals* of the Benedictine order. It has since been constantly sung throughout Western Christendom (as versions of it still are in the Church of England), as part of the appointed offices for the coronation of kings, the consecration and ordination of bishops and priests, the assembling of synods, and other great ecclesiastical solemnities.

The invention of "sequences" by Notker may be regarded as the beginning of the later mediæval epoch of Latin hymnody. In the eucharistic service, in which (as has been stated) hymns were not generally used, it had been the practice, except at certain seasons, to sing "laud," or "Alleluia," between the epistle and the gospel, and to fill up what would otherwise have been a long pause, by extending the cadence upon the two final vowels of the "Alleluia" into a protracted strain of music. It occurred to Notker that, while preserving the spirit of that part of the service, the monotony of the interval might be relieved by introducing at that point a chant of praise specially composed for the purpose.

The "Golden Sequence," "Veni, sancte Spiritus" ("Holy Spirit, Lord of Light"), is an early example of the transition of sequences from a simply rhythmical to a metrical form.

But the two most widely celebrated of all this class of compositions—works which have exercised the talents of the greatest musical composers, and of innumerable translators in almost all languages—are the "Dies Iræ" ("That day of wrath, that dreadful day"), by Thomas de Celano, the companion and biographer of St. Francis of Assisi (who died in 1226), and the "Stabat Mater dolorosa" ("By the cross sad vigil keeping") of Jacopone or Jacobus de Benedictis, a Franciscan humorist and reformer, who was persecuted by Pope Boniface VIII. for his satires on the prelacy of the time, and died very old in 1306.

There were other distinguished Latin hymn-writers of the latter mediæval period besides those already mentioned. The name of St. Bernard of Clairvaux cannot be passed over with the mere mention of the fact that he was the author of some metrical sequences. He was, in truth, the father, in Latin hymnody, of that warm and passionate form of devotion which some may consider to apply too freely to divine objects the language of human affection, but which has, nevertheless, been popular with many devout persons, in Protestant as well as Roman Catholic churches. Spee, "Angelus," Madame Guyon, Bishop Ken, Count Zinzendorf, and Frederick William Faber may be regarded as disciples in this school. Many hymns, in various languages, have been founded upon St. Bernard's "Jesu dulcis memoria" ("Jesu, the very thought of Thee"), "Jesu dulcedo cordium" ("Jesu, Thou joy of loving hearts"), and "Jesu Rex admirabilis" ("O Jesu, King most wonderful")—three portions of one poem, nearly 200 lines long.

Luther was a proficient in and a lover of music. He desired (as he says in the preface to his hymn-book of 1545) that this "beautiful ornament" might "in a right manner serve the great Creator and His Christian people." The persecuted Bohemian or Hussite Church, then settled on the borders of Moravia under the name of "United Brethren" (which their descendants still retain), had sent to him, on a mission in 1522, Michael Weiss, who not long afterward published a number of German translations from old Bohemian hymns (known as those of the "Bohemian Brethren"), with some of his own. These Luther highly approved and recommended. He himself, in 1522, published a small volume of 8 hymns, which was enlarged to 63 in 1527, and to 125 in 1545. He had formed what he called a "house choir" of musical friends, to select such old and popular tunes (whether secular or ecclesiastical) as might be found suitable, and to compose new melodies, for church use. His fellow laborers in this field (besides Weiss) were Justus Jonas, his own especial colleague; Paul Eber, the disciple and friend of Melanchthon; John Walther, choirmaster successively to several German princes, and professor of arts, etc., at Wittenberg; Nicholas Decius, who from a monk became a Protestant teacher in Brunswick, and translated the "Gloria in Excelsis," etc.; and Paul Speratus, chaplain to Duke Albert of Prussia in 1525. Some of their works are still popular in Germany.

Luther's own hymns, thirty-seven in number (of which about twelve are translations or adaptations from Latin originals), are for the principal Christian seasons; on the sacraments, the church, grace, death, etc.; and paraphrases of seven psalms, of a passage in Isaiah, and of the Lord's Prayer, Ten Commandments, Creed, Litany, and "Te Deum." There is also a very touching and stirring song on the martyrdom of two youths by fire at Brussels, in 1523-24. Homely and sometimes rugged in form, and for the most part objective in tone, they are full of fire, manly simplicity, and strong faith. Three rise above the rest. One for Christmas, "From Heaven above to earth I come," has a reverent tenderness, the influence of which may be traced in many later productions on the same subject. That on salvation through Christ, of a didactic character, "Dear Christian people, now rejoice," is said to have made many conversions, and to have been once taken up by a large congregation to silence a Roman Catholic preacher in the cathedral of Frankfort. Preeminent above all is the celebrated paraphrase of the forty-sixth Psalm: "A sure stronghold our God is He," "the production" (as Ranke says) "of the moment in which Luther, engaged in a conflict with a world of foes, sought strength in the consciousness that he was defending a divine cause which could never perish." Carlyle compares it to "a sound of Alpine avalanches, or the first murmur of earthquakes." Heine called it "the Marseillaise of the Reformation."

The principal hymn-writers of the Lutheran school, in the latter part of the sixteenth century, were Selnecker, Nicholas Hermann, and Hans Sachs, the shoemaker of Nuremberg, also known in other branches of literature. All these wrote some good hymns.

Toward the end of the seventeenth century, a new religious school arose, to which the name of "Pietists" was given, and of which Philip Jacob Spener was esteemed the founder. He and his pupils and successors, August Hermann Francke and Anastasius Freylinghausen, all wrote hymns. Spener's hymns are not remarkable, and Francke's are not numerous.

After the Reformation, the development of hymnody was retarded, in both parts of Great Britain, by the example and influence of Geneva. Archbishop Cranmer appears at one time to have been disposed to follow Luther's course, and to present to the people, in an English dress, some at least of the hymns of the ancient church.

The example thus set produced in England the translation commonly known as the "Old Version" of the Psalms. It was begun by Thomas Sternhold, whose position in the household of Henry VIII., and afterward of Edward VI., was similar to that of Marot with Francis I., and whose services to the former of those kings were rewarded by a substantial legacy under his will. Sternhold published versions of thirty-seven Psalms in 1549, with a dedication to King Edward, and died soon afterward. A second edition appeared in 1551, with seven more Psalms added, by John Hopkins, a Suffolk clergyman. The work was continued during Queen Mary's reign by British refugees at Geneva, the chief of whom were William Whittingham (afterward dean of Durham), who succeeded John Knox as minister of the English congregation there, and William Kethe (or Keith), said by Strype to have been a Scotchman. They published at Geneva in 1556 a service-book, containing fifty-one English metrical Psalms, which number was increased, in later editions, to eighty-seven. On the accession of Queen Elizabeth, this Genevan Psalmody was at once brought into use in England—first (according to a letter of Bishop Jewell to Peter Martyr, dated March 5, 1560) in one London church, from which it quickly spread to others both in London and in other cities. Jewell describes the effect produced by large congregations, of as many as 6,000 persons, young and old, women and children, singing it after the sermons at St. Paul's Cross. The first edition of the completed "Old Version" (containing forty Psalms by Sternhold, sixty-seven by Hopkins, fifteen by Whittingham, six by Kethe, and the rest by Thomas Norton, a barrister, Robert Wisdom, John Mardley, and Thomas Churchyard) appeared in 1562.

In this book, as published in 1562, and for many years afterward, there were (besides the versified Psalms) eleven metrical versions of the "Te Deum," canticles, Lord's Prayer, etc., etc. (the best of which is that of the "Benedicite"); and also "Da pacem, Domine," a hymn suitable to the times, rendered into English from Luther; two original hymns of praise, to be sung before Morning and Evening Prayer; two penitential hymns (one of them the "Humble Lamentation of a Sinner"); and a hymn of faith, beginning, "Lord in Thee is all my trust." In these respects, and also in the tunes which accompanied the words, there was a departure from the Genevan platform.

Two changes bearing on church hymnody were made upon the revision of the Prayer-book after the Restoration, in 1661–62. One was the addition, in the offices for consecrating bishops and ordaining priests, of the shorter version of "Veni Creator" ("Come, Holy Ghost, our souls inspire"), as an alternative form. The other, and more important, was the insertion of the rubric after the third Collect, at Morning and Evening Prayer: "In quires and places where they sing, here followeth the Anthem."

The "New Version" of the Psalms, by Dr. Nicholas Brady and the poet-laureate Nahum Tate (both Irishmen), appeared in 1696, under the sanction of an order in council of William III., "allowing and permitting" its use "in all such churches, chapels, and congregations as should think fit to receive it." No hymns were then appended to it; but the authors added a "Supplement" in 1703, which received an exactly similar sanction from an order in council of Queen Anne. In that Supplement there were several new versions of the canticles, etc., and of the "Veni Creator;" a variation of the old "Humble Lamentation of a Sinner;" six hymns for Christmas, Easter, and Holy Communion (all versions or paraphrases of Scripture), which are still usually printed at the end of the Prayer-books containing the new version; and a hymn "On the Divine use of Music"—all accompanied by tunes. The authors also reprinted, with very good taste, the excellent version of the "Benedicite" which appeared in the book of 1562. Of the hymns in this "Supplement," one ("While shepherds watched their flocks by night") greatly exceeded the rest in merit. It has been ascribed to Tate, but it has a character of simplicity unlike the rest of his works.

Conspicuous among the sacred poets of the first two Stuart reigns in England is the name of George Wither, an accomplished layman, of strong church principles, whose fate it was to be opposed and slighted while he was a stanch churchman and Royalist, and afterward to be driven into the parliamentary and Puritan ranks; for which cause, probably, recognition was denied to his genius as a poet by Dryden, Swift, and Pope. He had almost fallen into oblivion, when attention was recalled to his merits by the more discerning criticisms of Charles Lamb and Southey; and, when his *Hallelujah* was republished in 1857 by Mr. Farr, only two copies of it were known to exist, one in the British Museum, and another which had been in Mr. Heber's library.

Wither wrote, generally, in a pure nervous English idiom, and preferred the reputation of "rusticity" (an epithet applied to him even by Baxter) to the tricks and artifices of poetical style which were then in favor. It may be partly on that account that he has been better appreciated by posterity than by his contemporaries.

The hymns of Milton (on the Nativity, Passion, Circumcision, and "at a Solemn Music"), written about 1629, in his early manhood, were probably not intended for singing; but they are odes full of characteristic beauty and power.

During the Commonwealth, in 1654, Jeremy Taylor published, at the end of his *Golden Grove*, twenty-one hymns, described by himself as "celebrating the mysteries and chief festivals of the year, according to the manner of the ancient church, fitted to the fancy and devotion of the younger and pious persons, apt for memory, and to be joined to their other prayers."

Three other eminent names of the seventeenth century remain to be mentioned, John Dryden, Bishop Ken, and Bishop Simon Patrick; with which may be associated that of Addison, though he wrote in the eighteenth century.

The English Independents, as represented by Doctor Watts, have a just claim to be considered the real founders of modern English hymnody. Watts was the first to understand the nature of the want, and, by the publication of his *Hymns* in 1707–1709, and *Psalms* (not translations, but hymns founded on psalms) in 1719, he led the way in providing for it. His immediate followers were Simon Browne and Doddridge. Later in the eighteenth century, Hart, Gibbons, Grigg, and Mrs. Barbauld (the first two Independents, the last two Presbyterians), and Miss Steele, Medley, Samuel Stennett, Ryland, Beddome, and Swaine (all Baptists), succeeded to them.

Attention must be directed to the hymns produced by the "Methodist" movement, which began about 1738, and which afterward became divided, between those esteemed Arminian, under John Wesley, those who adhered to the Moravians, when the original alliance between that body and the founders of Methodism was dissolved, and the Calvinists, of whom Whitfield (himself no poet) was the leader, and Selina, countess of Huntingdon, the patroness. Each of these sections had its own hymn-writers, some of whom did, and others did not, secede from the Church of England. The Wesleyans had Charles Wesley, Seagrave, Olivers and Bakewell; the Moravians, Cennick and Hammond (with whom, perhaps, may be classed John Byrom, who imbibed the mystical ideas of some of the German schools); the Calvinists, Toplady, Berridge, William Williams, Madan, Batty, Haweis, Rowland Hill, John Newton, and Cowper.

Among all these writers, the palm undoubtedly belongs to Charles Wesley. In the first volume of hymns published by the two brothers are several good translations from the German, believed to be by John Wesley, who, although he translated and adapted, is not supposed to have written any original hymns; and the influence of German hymnody, particularly of the works of Paul Gerhardt, Scheffler, Tersteegen, and Zinzendorf, may be traced in a large proportion of Charles Wesley's works. Of his spirited style there are few better examples than "O for a thousand tongues to sing," "Blow ye the trumpet, blow," "Rejoice, the Lord is King," and "Come, let us join our friends above;" of his more tender vein, "Happy soul, thy days are ended;" and of his fervid, contemplative style (without going beyond hymns fit for general use), "O Thou who camest from above," "Forth in thy name, O Lord, I go," and "Eternal Beam of Light Divine." With those whose taste is for hymns in which warm religious feelings are warmly and demonstratively expressed, "Jesus, lover of my soul," is as popular as any of these.

The Moravian Methodists produced few hymns now available for general use. The contributions of the Calvinistic Methodists to English hymnody are of greater extent and value. Few writers of hymns had higher gifts than Augustus Montague Toplady, author of "Rock of Ages," by some esteemed the finest in the English language.

If the number as well as the quality of good hymns available for general use is to be regarded, the authors of the "Olney Hymns" are entitled to be placed at the head of all the writers of this Calvinistic school. The greater number of the Olney Hymns are, no doubt, homely and didactic; but to the best of them (and they are no inconsiderable proportion) the tenderness of Cowper and the manliness of Newton give the interest of contrast, as well as that of sustained reality. Cowper's hymns in this book are, almost without exception, worthy of his name. Among them are "Hark, my soul, it is the Lord," "There is a fountain filled with blood," "Far from the world, O Lord, I flee," "God moves in a mysterious way," and "Sometimes a light surprises." Some, perhaps, even of these, and others of equal excellence (such as "O for a closer walk with God"), speak the language of a special experience, which, in Cowper's case, was only too real, but which could not (without a degree of unreality not desirable in exercises of public worship) be applied to themselves by all ordinary Christians.

During the first quarter of the present century there were not many indications of the tendency, which afterward became manifest, to enlarge the boundaries of British hymnody. A few, indeed, of Bishop Heber's hymns, and those of Sir Robert Grant (which, though offending rather too much against John Newton's canon, are well known and popular), appeared between 1811 and 1816, in the *Christian Observer*. In John Bowdler's *Remains*, published soon after his death in 1815, there are a few more of the same, perhaps too scholarlike, character. But the chief hymn-writers of that period were two clergymen of the Established Church—one in Ireland, Thomas Kelly, and the other in England, William Hurn—who both became Nonconformists, and the Moravian poet, James Montgomery, a native of Scotland.

During this first quarter of the present century, the collections of miscellaneous hymns for congregational use, of which the example was set by the Wesleys, Whitfield, Toplady, and Lady Huntingdon, had greatly multiplied; and with them the practice (for which, indeed, too many precedents existed in the history of Latin and German hymnody) of every collector altering the compositions of other men without scruple, to suit his own doctrine or taste; with the effect, too generally, of patching and disfiguring, spoiling and emasculating the works so altered, substituting neutral tints for natural coloring, and a dead for a living sense. In the Church of England, the use of these collections had become frequent in churches and chapels (principally in cities and towns) where the sentiments of the clergy approximated to those of the Nonconformists. In rural parishes, when the clergy were not of the "Evangelical" school, they were generally held in disfavor; for which (even if doctrinal prepossessions had not entered into the question) the great want of taste and judgment often manifested in their compilation, and perhaps also the prevailing mediocrity of the bulk of the original compositions from which most of them were derived, would be enough to account. In addition to this, the idea that no hymns ought to be used in any services of the Church of England (except prose anthems after the third collect), without express royal or ecclesiastical authority, continued down to that time largely to prevail among churchmen of the higher school.

Two publications, which appeared almost simultaneously in 1827—Bishop Heber's *Hymns*, with a few added by Dean Milman, and Keble's *Christian Year* (not a hymn-book, but one from which several admirable hymns have been taken, and the well-spring of many streams of thought and feeling by which good hymns have since been produced)—introduced a new epoch, breaking down the barrier as to hymnody which had till then existed between the different theological schools of the Church of England. In this movement Bishop Mant was also one of the first to coöperate. It soon received a great additional impulse from the increased attention which, about the same time, began to be paid to ancient hymnody, and from the publication in 1833 of Bunsen's *Gesangbuch*. Among its earliest fruits was the *Lyra Apostolica*, containing hymns, sonnets, and other devotional poems, most of them originally contributed by some of the leading authors of the *Tracts for the Times* to the *British Magazine*; the finest of which is the pathetic "Lead, kindly Light, amid th' encircling gloom," by John Henry (now Cardinal) Newman, well known, and universally admired. From that time hymns and hymn-writers rapidly multiplied in the Church of England, and in Scotland also, and their number is still on the increase. Nearly 600 authors, whose publications were later than 1827, are enumerated in Mr. Sedgwick's catalogue of 1863, and many more have since appeared. To mention all the authors of good hymns since the commencement of this new epoch would be impossible; but probably no names could be chosen more fairly representative of its characteristic merits, and perhaps also of some of its defects, than those of Josiah Conder and James Edmeston among English Nonconformists; Henry Francis Lyte and Charlotte Elliott among evangelicals in the Church of England; John Mason Neale and Bishop Christopher Wordsworth among English churchmen of the higher school; and, in Scotland, Dr. Horatius Bonar. Criticism, in this place, of the works of these and other living or recent authors, or of those of Heber and Keble, which are on everybody's lips, and in everybody's hands, would be at once premature and superfluous.

What has been said of British hymnody during the last fifty years is equally true of American. The American hymn-writers belong to the same schools, and have been affected by the same influences. Some of them enjoy a just reputation on both sides of the Atlantic. Among those best known are Bishop Doane, Doctor Muhlenberg, and Mr. Thomas Hastings; and it is difficult to praise too highly such works as the Christmas hymn, "It came upon the midnight clear," by Mr. Edmund H. Sears; the Ascension hymn, "Thou, who didst stoop below," by Mrs. S. E. Miles; and two by Dr. Ray Palmer, "My faith looks up to Thee, Thou Lamb of Calvary," and "Jesus, Thou joy of loving hearts," the latter of which is the best among several good English versions of "Jesu, dulcedo cordium."

HYPATIA, mathematician, philosopher, and finally one of the martyrs of paganism, was the daughter and disciple of the mathematician and philosopher Theon, and was born in Alexandria not earlier than 350 A.D. After a long period of study (partly, perhaps, in Athens) she became a distinguished lecturer on philosophy in her native town, and ultimately became the recognized head of the Neo-Platonic school there (*c.* 400). The fascination of her great eloquence (she is said on more than one occasion to have proved an effective advocate in the courts of law), and the charm of a rare modesty and beauty, combined with her remarkable intellectual gifts to attract to her class-room a large number of disciples, over some of whom her influence was very great. Among these was Synesius, who afterward (*c.* 410) became bishop of Ptolemais, several of whose letters addressed to her, full of chivalrous admiration and reverence, are still extant. In the conflicts between the various elements of Alexandrian society which took place shortly after the accession of Cyril to the patriarchate in 412, she became closely identified as counselor and friend with the prefect Orestes, and in the same degree made herself an object of fear and hatred to the Nitrian monks and the fanatical Christian mob, by whom she was ultimately murdered under circumstances of revolting barbarity. Socrates has related how she was torn from her chariot, dragged to the Cæsareum (then a Christian church), stripped naked, cut to pieces with oyster shells, and finally burnt piecemeal. Most prominent among the actual perpetrators of the crime was one Peter, a reader; but there seems little reason to doubt Theodoret's assertion of Cyril's real complicity.

HYPERIDES, one of the ten Attic orators, was son of Glaucippus, of a noble family of the tribe Ægeis and the deme Collytus. He was probably younger than Lycurgus (born about 396 B.C.) and older than Demosthenes, (born about 385 B.C.) Having studied under Isocrates, he began life as a writer of speeches for the courts, and in 360 B.C. he prosecuted Autocles, a general charged with treason in Thrace. From the end of the Sacred War, 346–324 B.C., Hyperides supported Demosthenes in the struggle against Macedon; but in the affair of Harpalus he was one of the ten public prosecutors of Demosthenes, and on the exile of his former leader he became the head of the patriotic party (see DEMOSTHENES). He was the chief promoter of the Lamian War against Antipater and Craterus. After the decisive defeat of Crannon, 322 B.C., Hyperides with the other orators demanded by Antipater was condemned to death by the subdued Athenians, but fled to Ægina and thence into sanctuary in the temple of Demeter at Hermione. Antipater's emissaries dragged him forth to be put to death at Athens.

HYPERTROPHY (ὑπέρ over, τροφή nourishment) a term in medicine employed to designate an abnormal increase in bulk of one or more of the organs or component tissues of the body. In its strict sense this term can only be applied where the increase affects the natural textures of a part, and is not applicable where the enlargement is due to the presence of some extraneous morbid formation. Hypertrophy of a part may manifest itself either by simply an increase in the size of its constituents, or by this combined with an increase in their number (hyperplasia). In many instances both are associated.

HYPNOTISM is now extensively used on the continent of Europe in treating disease, and is slowly finding its way into practice in the United States. It is impossible to suppose that hypnotism will ever fulfill the sanguine expectations of many of its exponents, though it seems possible that it may render aid as a therapeutic agent in treating some kinds of diseases. It is still necessary to write very guardedly upon the subject, as its action when used for the cure of disease is imperfectly understood. Hypnotism is not any longer to be regarded as a mystery or as a superhuman gift, for its action can for the most part be explained by our present knowledge of physiology and psychology. The chief reason why hypnotism cannot be universally employed as a therapeutic agent is the fact that only a certain proportion of persons can be hypnotized. The proportion, however, of persons insusceptible to its power is much less than was at one time thought; and, when used therapeutically, somnambulism, the deepest stage of hynotism, is not necessary. On the Continent it is found that about 80 per cent. of the inhabitants can be hypnotized.

Hypnosis may be used in two ways in relation to disease. In the first place, simple sleep is induced, and sleep when produced without the action of drugs is often of great importance, and of itself aids in treatment. Again, in many cases when the person is asleep, suggestions may be made to him which will abolish pain, and which in some diseases will bring about either the relief of symptoms or the cure of the disease. Every one knows that the mind influences the body, and that concentrated thought can bring about sensations in various localities. It is upon this knowledge that the hypnotist bases his practice. The patient being placed in a hypnotic sleep, his attention is directed to various parts of the body, and very often the effect is increased through local stimulation by means of passes or rubbing. During the hypnotic sleep the patient is uninfluenced by his surroundings, and therefore he is all the more open to suggestions, and no disturbing influences diminish his powers of concentration. By means such as these neuralgic or rheumatic pains may frequently be removed; headaches may often be cured, and so may some forms of dyspepsia, as well as the various manifestations of hysteria and hypochondriasis, and even functional paralysis. It is found, too, that hypnotism is useful in dipsomania and in treating persons addicted to opium-eating and other depraved tastes. At present it cannot be said that hypnotism is of use in any disease having an organic origin, although in such diseases various symptoms, especially those of pain, may be removed successfully. It is quite possible for operations to be performed upon persons under the hypnotic influence without the slightest pain being felt by the patient; but as various other anæsthetics are more easily employed, it is only in a few cases where these are contra-indicated that hypnotism will be used in this connection.

For educational purposes it is held possible to impress a person in the hypnotic sleep with ideas which will modify his usual character. For instance, it seems possible in many cases to cure persons of bad habits, such as stealing, lying, or the excessive use of alcohol; and attempts are being made to influence habitual criminals for good by hypnosis. Young children, defective in brain power or constitutionally vicious, may be improved by careful hypnotic treatment. It is a mistake to suppose that hypnotism can only be used successfully in treating nervous or hysterical persons. Such persons are often difficult to hypnotize, and there is always a danger of either increasing their troubles or in some cases of inducing insanity. Ordinary individuals, especially those who have learned to obey, are the subjects whom a hypnotist would prefer to treat. In many cases of insanity hypnotism may be used with advantage as a therapeutic agent, although its employment in these cases is not by any means easy. Persons suffering from hallucinations, it is said, have been cured, and those who suffer from the painful result of some grievous trouble have been restored by having the incident blotted out from their memory.

Although hypnotism has power for good when properly used by medical men, it is an exceedingly dangerous weapon in the hands of the unskillful and unscrupulous. All public exhibitions of hypnotism should be prohibited by law, as persons experimented upon have been rendered lunatics, or had their nervous systems severely damaged.

HYPOCHONDRIASIS (synonyms, the spleen, the vapors). As the name implies, hypochondriasis and its symptoms were referred by the ancients, and indeed by physicians down to the time of Cullen, to diseases or derangements of one or more of the abdominal viscera. Cullen classified it among nervous diseases, and Falret more fully described it as a morbid condition of the nervous system characterized by depression of feeling and false beliefs as to an impaired state of the health.

HYPODERMIC INJECTION. This method, first introduced by the late Dr. Alexander Wood of Edinburgh, is an extremely valuable one in certain cases, though its applicability is limited. It consists in the injection of a solution of the substance to be given beneath the skin, by means of a fine hollow needle to which a small syringe is attached. The prick given by the needle is much less acutely felt by the patient if the needle be lubricated with carbolic oil or the like. Absorption from the subcutaneous tissue takes place speedily, and is not interfered with by vomiting, or other conditions of the stomach which may delay or prevent the entrance of the remedy into the system by that channel. The action of the drug is thus at once more rapid and more certain than when administered by the mouth; and a smaller dose is required. Only such substances as can be given in small bulk and in an unirritating condition are available. It is thus chiefly of use for the vegetable alkaloids, of which morphia is far the most often employed. It need hardly be said that it is to be used only by skilled hands. The same method is largely employed in experiments on the action of disease, poisons in animals, and in Pasteur's treatment of hydrophobia.

HYPOTHEC (*Hypotheca*), in Roman law is the most advanced form of the contract of pledge. A specific thing may be given absolutely to a creditor on the understanding that it is to be given back when the creditor's debt is paid; or the property in the thing may be assigned to the creditor while the debtor is allowed to remain in possession, the creditor as owner being able to take possession if his debt is not discharged. Here we have the kind of security known as pledge and mortgage respectively.

HYRAX, a genus of diminutive plantigrade mammals, the position of which in the mammalian series has, owing to their apparent affinity with several widely different groups, given rise to considerable controversy. Professor Huxley established the order *Hyracoidea* for their reception. They are small, rabbit-like creatures, the largest not exceeding eighteen inches in length, covered with a thick, soft fur with numerous bristles interspersed. Their ears and legs are short; the tail is represented only by a small tubercle; and their toes, of which they have four on each foot in front and three behind, are, with the exception of the inner one on each hind foot, provided with flat, hoof-like nails. They have twenty-one pairs of ribs—a larger number than is possessed by any other mammal except the sloths, which have twenty-three pairs. They are gregarious animals, dwelling in colonies in the crevices of rocks and in the caverns which abound in the hilly regions they frequent, and feeding on grass and other herbage, on roots, fruits, and the tender shoots of plants.

HYRCANIA, a province of Asia, south of the Caspian Sea, and bounded on the east by the river Oxus. It was, however, a wide and indefinite tract, the extent of which is variously conceived. Its chief city is called Tape by Strabo, Zadracarta by Arrian. The latter is evidently the same as Carta, mentioned by Strabo as an important city.

HYRCANUS (Ὑρκανός), a Greek surname, of unknown origin, borne by several Jews of the Maccabean period.

JOHN HYRCANUS I., high priest of the Jews from 135 to 105 B.C., was the youngest son of Simon Maccabeus. He died in 105, and was succeeded by Aristobulus, the eldest of his five sons.

JOHN HYRCANUS II., high priest from 78 to 40 B.C., was the eldest son of Alexander Jannæus by his wife Alexandra, and was thus a grandson of the preceding. When his father died in 78, he was by his mother forthwith appointed high priest, and on her death in 69 he claimed the succession to the supreme civil authority also. In 41 B.C. he was practically superseded by

Antony's appointment of Herod and Phasael to be tetrarch of Judæa; and in the following year he was taken prisoner by the Parthians, deprived of his ears that he might be permanently disqualified for priestly office, and carried to Babylon. He was permitted in 33 B.C. to return to Jerusalem, where, on a charge of treasonable correspondence with Malchus, king of Arabia, he was put to death in 30 B.C.

HYSSOP (*Hyssopus officinalis*), a garden herb belonging to the natural order *Labiatæ*, cultivated for use in domestic medicine. It is a small perennial plant about two feet high, with slender, quadrangular, woody stems; narrowly elliptical, pointed, entire, dotted leaves, about one inch long and one-third inch wide, growing in pairs on the stem; and long, terminal, erect, half-verticillate, leafy spikes of small, violet-blue flowers, which are in blossom from June to September. Two varieties of the plant occur in gardens, one having variegated leaves and the other reddish flowers. The leaves have a warm, aromatic, bitter taste, and are believed to owe their properties to a volatile oil which is present in the proportion of ¼ to ½ per cent. Hyssop is a native of the south of Europe, its range extending eastward to Siberia; it was introduced into England by Gerard in the year 1596. A strong tea made of the leaves, and sweetened with honey, was formerly used in pulmonary and catarrhal affections, and externally as an application to bruises and indolent swellings.

The Hedge Hyssop (*Gratiola officinalis*) belongs to the natural order *Scrophulariaceæ*, and is a native of marshy lands in the south of Europe, whence it was introduced into Britain nearly 300 years ago.

HYSTERIA, a term applied to a disordered condition of the nervous system, the anatomical seat and nature of which are unknown to medical science, but of which the symptoms consist in well-marked and very varied disturbances of nerve function. By the ancients and by modern physicians down to the time of Sydenham its symptoms were supposed to be due to disturbances of the uterus (ὑστέρα, whence the name), but it is now universally recognized that they are dependent on a variety of causes with which that organ has no necessary connection. The causes of hysteria may be divided into the predisposing, such as hereditary predisposition to nervous degeneration, sex, age, occupation, and national idiosyncracy; and the immediate, such as mental and physical exhaustion, fright, and other emotional influences, pregnancy, the puerperal condition, diseases of the uterus and its appendages, and the depressing influence of injury or general disease. Each and all of these causes may act and react in any given case; in fact, it is nearly always impossible to assign a particular cause in a particular instance. Perhaps, taken over all, hereditary predisposition to nerve-instability may be asserted as the most prolific cause. It is often noticed in families in which this instability exists that hysteria presents itself to a greater or less extent in a considerable number of its members as the sole indication of the diathesis. As regards age the condition is apt to appear at the evolutional periods of life—puberty, pregnancy, and the climacteric—without any further assignable cause except that first spoken of. It is very frequent in girls between the ages of twelve and fifteen, and in women on the cessation of the menstrual flow. It is much more common in the female than the male—in the proportion of twenty to one—which circumstance, points to the important influence of the uterus in causation, but definitely places hysteria in the category of nervous diseases. It has been asserted that certain races are more liable to the disease than others—that for instance, the Latins and the Slavs are more prone to it than other inhabitants of Europe. This, however, is doubtful; in the more excitable races we find on the whole a greater tendency to hysterical excitement, in those whose national characteristic is calm and impassionateness a tendency to hysterical depression; and it is probable that the greater prominence of the symptoms in the former may have masked the more subtle yet not less important manifestations of the disease presented in the latter. Occupation, or be it rather said want of occupation, is a prolific cause. This is noticeable in all classes of society; in the higher the idle, luxurious woman concentrates herself upon herself, and the frivolity of her existence helps to aggravate the evil which may be innate in her constitution; in the lower classes the disease is not so prevalent except among women who live a vicious and excited life. The experience of prison authorities shows not only that women of the criminal classes are individually liable to the hysterical paroxysm, but that it is very apt to assume an epidemic form among them. There is no proof that any particular legitimate occupation tends to its development. The depressing effects of almost any disease may be directly productive of hysteria, more especially those accompanied by pain and loss of sleep. There can be little doubt, however, that disease of the uterus and its appendages has a greater tendency toward its production than disease of any other system. At the same time, hysteria seems to follow more frequently on the less severe than on the graver forms of uterine complaints.

In point of duration hysteria may be transient or chronic. In the first phase it consists of an explosion of emotionalism, generally the result of mental excitement, to which the popular term "hysterics" is applied. Such attacks are generally preceded and accompanied by a sensation of a lump in the throat (the "globus hystericus"), a flow of limpid urine, violent outbursts of alternate laughter and weeping, and sometimes even convulsion. In the chronic condition we find an extraordinary complexity of symptoms, both physical and mental. These are continuous, constituting the "status hystericus," and paroxysmal. The physical symptoms are extremely diverse; there may be a pseudo-paralysis, the patient lying palsied wholly or partially, or there may be rigidity of one or more limbs, in either case the system persisting for weeks or months or even years; there may be flushing or pallor of the face, an increase or decrease of temperature. Perversions of sensation are frequent symptons; these consist in complaint of pain, generally of a local character; a common instance is the sensation of a nail being driven through the vertex of the head ("clavus hystericus"), or of increased sensibility of particular parts. On the other hand loss of sensation may be complained of, or, as occasionally happens, hyperæsthesia and anæsthesia may be stated by an individual to exist in different parts of the body. The region of the spine is a very frequent seat of hysterical pain. Pain, more especially when referred to a joint, is apt to be accompanied by swelling. Both the motor and the sensory symptoms are in every instance out of all proportion to any assignable cause, and for the most part disappear suddenly, leaving the patient in perfect health. It is to such cases that the wonderful cures effected by quacks and charlatans may be referred. The mental symptoms have not the same tendency to pass away suddenly. They may be spoken of as inter-paroxysmal and paroxysmal. The chief characteristics of the former are extreme emotionalism combined with a curious obstructiveness, a desire to be an object of importance, and a constant craving for sympathy. This is sought to be procured at an immense sacrifice of personal comfort, and to this may be referred a very large proportion of the motor and sensory symptoms above spoken of. The paroxysmal condition does not materially differ from the transient hysteric attack, except that convulsion is more common and more violent. The special senses of taste, sight and hearing may be affected, sometimes temporarily obliterated. Hysteria may pass into absolute insanity.

Treatment consists in attention to the general health, and to such special symptoms as may arise, notably those connected with the function of menstruation. The submission of the patient to the best moral influences is of no mean importance. But it may be admitted that the results are generally unsatisfactory so far as medication is concerned, as the cure is usually spontaneous or dependent on some sudden mental influence.

HYSTERO-EPILEPSY, a nervous disease of women, occurring during the fertile period of life, first observed and described by Professor Charcot of Paris. Its phenomena are very extraordinary, and serious doubts have been entertained by eminent authorities as to their substantiality, it being asserted that they are merely manifestations of ordinary hysteria, intensified by a process of education. But these doubts are being rapidly dissipated by the observations of competent observers. The disease is of a paroxysmal nature, and its symptoms may be divided into inter-paroxysmal and paroxysmal. The former consist of extreme sensitiveness over the region of one or (less frequently) both ovaries, and loss of tactile sensibility and complete insensibility to pain in one lateral half of the body, the side on which ovarian tenderness exists. Sight is sometimes implicated, manifested by a peculiar form of color-blindness. Perhaps the most remarkable phenomenon presented in this disease is that all these impairments of sensation may be shifted to the other side of the body on the application of magnets and plates of metals, the originally affected side regaining sensibility so long as the opposite one is insensible. In some cases the symptoms are permanently bilateral. The paroxysm consists in violent general convulsion, epileptiform in character, which is at once checked by pressure over the tender ovary. The mental faculties are generally weakened, and the disease is for the most part incurable.

HYTHE, a municipal and parliamentary borough of Kent, England, and one of the original Cinque Ports, is beautifully situated at the foot of a steep cliff near the eastern extremity of Romney Marsh, about half a mile from the sea, on a branch line of the South-Eastern Railway, sixty-six miles east-southeast of London, sixteen southwest of Dover, and five west of Folkestone. Population (1901), about 6,000.

I.

I is one of those symbols which the Greeks employed differently from the Phœnicians. In Phœnician it denoted the palatal semi-vowel *y* called in Hebrew *yodh*. The Greeks disliked this sound, and it vanished at an early time out of their language. Consequently they needed no symbol to represent it, and could use the Phœnician symbol to denote that for which the Phœnician alphabet gave them no help, namely, the vowel *i*. Generally we find it in Greek in the single straight line with which we are familiar. It has no other form in the Latin alphabet. In the last century before Christ, the Romans sometimes lengthened the symbol to denote the long vowel, so that it reached above the top of the line, while the short vowel was expressed by a line of the usual length.

The value of the symbol is generally constant in all European languages, ancient or modern, with the exception of English. It is the vowel sound produced by raising the front of the tongue toward the palate, as high as it can be raised without touching. The lips are not rounded; by rounding them, when the tongue is in this position, we should produce the sound of the French *u* or the German *ü*. The vowel may, however, be either open or close, and in either of these cases it may be short or long. Therefore we have four variations, of which, however, probably not more than two are found in any spoken language:—(1) the short open *i*, heard in English "sin;" (2) the long open *i*, which is not one of our spoken sounds, but can be produced in singing; (3) the short, close *i*, which again is not English, but is the Italian short *i*; (4) the long, close *i*, which is the Italian long *i*, and is also common in English; but we denote the sound, not by *ī*, but by *ee*, as in "seen." It is generally supposed that the sound of *ee* stands to that of *i* in English as a long vowel to the corresponding short; but this is not so; there is a difference in quality as well; *ee* denotes (as has just been explained) a close vowel, whereas *i* is open. It is true that in ordinary English the open vowel *i* only occurs short, and the close vowel long, therefore the confusion is natural. A Scotchman, however, finds no difficulty in pronouncing "seen" short.

IAMBLICHUS, the chief representative of Syrian Neo-Platonism, is only imperfectly known to us in the events of his life and the details of his creed. We learn, however, from Suidas, and from his biographer Eunapius, that he was born at Chalcis in Cœle-Syria, the scion of a rich and illustrious family; that he studied under Anatolius, and afterward under Porphyry, the pupil of Plotinus; that he himself gathered together a large number of disciples of different nations, with whom he lived on terms of genial friendship; that he wrote "various philosophical books," and that he died during the reign of Constantine—according to Fabricius, before 333 A.D. His residence (probably) at his native town of Chalcis was varied by a yearly visit with his pupils to the baths of Gadara. Of the books referred to by Suidas only a fraction has been preserved.

IBADAN, a large and flourishing town of West Africa, in the Yoruba country, about eighty miles inland from Lagos, and about fifty miles to the northeast of Abeokuta. The population of Ibadan is not less than 100,000. The great bulk of the population consists of slaves. There are twenty-four mosques and several Mahometan schools in the town.

IBARRA, a city of Ecuador in South America, the capital of the province of Imbabura, is situated on a plain about 2,000 feet lower than Quito, from which it is thirty miles distant. Before the earthquake of 1868 it was a place of considerable prosperity, with regular streets and well-built houses, and about 13,000 of a population, but in that terrible disaster it is estimated that no fewer than 10,000 of its inhabitants perished.

IBERIANS. To the question, Who are the Iberians? it is impossible to give a satisfactory answer in the form of a concise definition. While our knowledge of their actual history is comparatively slight, the position which they have acquired in modern ethnographical theory is at once a prominent and a perplexing one. It is almost impossible to hazard any statement in regard to them which will not find an impugning voice from one quarter or other. Historical, numismatical, linguistic, and anthropological evidences have been brought to bear on the problem of their affinity, and the result is on the whole not so much light as darkness visible.

The name Iberians seems to have been applied by the earlier Greek navigators to the peoples who inhabitated the eastern coast of Spain; and there is considerable probability in the suggestion that it originally meant the riparians of the Iberus or Ebro. On the other hand, the term Iberia is said to have embraced in older Greek usage the country as far east as the Rhone, and by the time of Strabo it was the common Greek name for the Spanish peninsula—Iberians meaning sometimes the inhabitants of the peninsula in general, and sometimes, it would appear, the peoples of a definite race. Of the tribal distribution of this race, of its linguistic, social, and political characteristics, and of the history of its relation to the other peoples of Spain, we have only the most general, fragmentary, and in part self-contradictory accounts. On the whole our historical evidence authorizes the assertion that in Spain, when it first became known to the Romans and Greeks, there existed a large number of separate and variously civilized tribes connected with each other by at least apparent identity of race, and by similarity (but not identity) of language, their general characteristics sufficiently differencing them from Phœnicians, Romans and Celts. The statement that the mingling of these Iberians with the immigrant Celts gave rise to the Celtiberians (Keltiberians) is in itself sufficiently probable, and has been impugned by nothing more precise than the general untrustworthiness of the author by whom it is made (Diodorous Siculus). Varro and Dionysius Afer went so far as to identify the Iberians of Spain with the Iberians of the Caucasus, the one regarding the eastern and the other the western settlements as of earlier date.

IBEX, the common name of several closely allied species of ruminant mammals, belonging to the genus *Capra* or goats, inhabiting the loftiest regions of Europe, Asia, and Africa. The European ibex or steinboc (*Capra ibex*) abounded during the Middle Ages among the higher mountain ranges of Germany, Switzerland, and the Ural, but has since disappeared from the greater part of this area, being now almost wholly confined to the Alps which separate Valais from Piedmont, and to the lofty peaks of Savoy, where its continued existence is mainly due to the action of protective game laws. The ibex is a handsome animal, measuring about four and one-half feet in length and two and one-half feet high; its skin is covered in summer with a short fur of an ashy gray color, and in winter with much longer yellowish-brown hair concealing a dense fur beneath. A short beard is present in the male in winter, but, as it disappears altogether in spring, Darwin regards this appendage as rudimentary. The horns, especially in the male, form a striking feature: rising from the crest of the skull, they bend gradually backward, attaining a length in old specimens of about two feet; they are thick and flat, and have the anterior face ridged with knotty transverse bands. In the female the horns never exceed half a foot in length, and are much less rugose than in the male. The front legs are somewhat shorter than those behind, which enables the ibex to ascend the mountain slopes with more facility than it can descend, while its hoofs are as hard as steel, rough underneath, and when walking over a flat surface capable of being spread out. These, together with its powerful sinews, enable it to take prodigious leaps, to balance itself on the smallest foothold, and to scale almost perpendicular rocks. The ibex lives habitually at a greater height than the chamois or any other of the Alpine mammals, its vertical limit being the line of perpetual snow. There it rests in sunny nooks during the day, descending at night to the highest woods to graze, and retiring at sunrise to its snowy fastnesses. This return journey forms the ibex hunter's opportunity. To get within gunshot the huntsman has usually to approach from above; accordingly he ascends to the limit of perpetual snow, and there passes the night among the daily haunts of the ibex, lying in wait from early dawn for its return. The ibexes are gregarious, feeding in herds of ten to fifteen individuals; the old males, however, generally live apart from, and usually at greater elevations than, the females and young. They are said to give out a sharp whistling sound not unlike that of the chamois, but when greatly irritated or frightened they make a peculiar snorting noise. The period of gestation in the female is ninety days, after which she produces—usually at the end of June—a single young one, which is able at once to follow its mother. These when caught young and fed on goat's milk can, it is said, be readily tamed; and in the sixteenth century young tamed ibexes were frequently driven to the mountains along with the goats, in whose company they would afterward voluntarily return. Even wild specimens have thus been known to stray among the herds of goats, although, strange to say, they at all times shun the society of the chamois. The ibex was formerly hunted largely for its flesh and skin; but, although the latter, owing to its scarcity, now commands a high price, the difficulty arising from the operation of the game laws, and above all the difficulty and danger inseparable from the sport, have reduced the number of hunters to a few hardy mountaineers, who find in the pursuit of the ibex the keenest enjoyment of life. For weeks the sportsman will follow a track across fields of ice, along narrow ledges, over precipices, and across chasms, nearly frozen to death at night, and often with little more than a crust of bread for sustenance, yet considering himself more than repaid by the sight at last of his prey grazing within range of his rifle. Its flesh is said to resemble mutton, but has the flavor of game.

IBIS, one of the most sacred birds of the ancient Egyptians, which in modern times was identified by Bruce with the *Abou-Hannes* or "Father John" of the Abyssinians, and in 1790 received from Latham the name of *Tantalus æthiopicus.*

The Ibis is chiefly an inhabitant of the Nile basin in Nubia, from Dongolia southward, as well as of Kordofan and Sennaar; whence about midsummer, as the river rises, it moves northward to Egypt, and reaches the delta, passing over the intermediate districts, in a way not unknown elsewhere among migratory birds. In Lower Egypt it bears the name of *Abou-mengel,* or "Father of the Sickle," from the form of its bill, but it does not stay long in that country, disappearing, by all accounts, when the inundation has subsided. The old story told to Herodotus of its destroying snakes is, according to Savigny, devoid of truth, and that naturalist found, from dissection of the examples he obtained, that its usual food was fresh-water univalve mollusks; but Cuvier asserts that he discovered partly digested remains of a snake in the stomach of a mummied Ibis which he examined, and there can be little doubt that insects and crustaceans, to say nothing of other living creatures, enter on occasion into the bird's diet.

The Ibis is somewhat larger than a curlew, which bird it in appearance calls to mind, with a much stouter bill and stouter legs. The head and greater part of the neck are bare and black. The plumage is white, except the primaries, which are black, and a black plume, formed by the secondaries, tertials, and lower scapulars, and richly glossed with bronze, blue and green, which curves gracefully over the hind-quarters. The bill and feet are also black. The young lack the ornamental plume, and in them the head and neck are clothed with short, black feathers, while the bill is yellow. The nest is placed in bushes or high trees, the bird generally building in companies, and in the middle of August Von Heuglin found that it had from two to four young or much incubated eggs. These are of a dingy white, splashed, spotted and speckled with reddish brown.

IBN BATUTA, whose proper name was Abu-Abdullah Mahommed, one of the most remarkable of travelers and autobiographers, was born at Tangiers in 1304. He entered on his travels at the age of twenty-one (1325), and closed them in 1355. He died in 1378.

IBN EZRA. See ABENEZRA.

IBN KHALDOUN, a celebrated Arabic historian, poet, and philosopher, was born at Tunis on the 1st Ramadhan 732 A.H. (February 8, 1332). He died on the 25th Ramadhan 808 A.H. (March 16, 1406), at the age of sixty-four.

IBN KHALLIKAN, Abu 'l Abbâs Ahmed, better known as Ibn Khallikan, author of the celebrated Arabic biographical dictionary, was born at Arbela on September 22, 1211. He died in 1282.

IBN SINA. See AVICENNA.

IBO, IBU, IGBO, or EBOE, a district of West Africa, situated in the delta of the Niger, and mainly on the left or eastern bank of the river. The chief town, which is frequently called by the same name, but is more correctly designated Abo or Áboh, lies on a creek which falls into the main stream about 150 miles from its mouth, and contains from 6,000 to 8,000 inhabitants. The Ibo are a strong, well-built Negro race. Their women are distinguished by their embonpoint, which is considered by the people themselves as the perfection of beauty. The language of the Ibo is one of the most important in the Niger delta, and is gradually extending its area.

IBRAHIM PASHA, viceroy of Egypt, a real or adopted son of Mehemet Ali, was born at Cavalla in Roumelia in 1789. Early associated with the Egyptian army, he won a name for himself by successful operations against the rebel tribes of Upper Egypt and the fugitive Mamelukes in Nubia, before he entered his twenty-fifth year. In an expedition which he led in 1816 against the Wahhábees of Arabia, the young general was seriously hampered by the want of organized discipline among his troops, and on his triumphant return to Cairo in 1819 he eagerly availed himself of the services of some French officers in his efforts to convert the Oriental turbulence of his forces into the disciplined steadiness of the West. Ibrahim's next campaign was in Greece, whither he was ordered in August, 1824, to support the Turkish sultan's attempts to restrain the risings of Hellenic nationality. The defeat of the Turkish and Egyptian fleet at Navarino (October 20, 1827), by the united English, French and Russian squadrons was the signal for Ibrahim's recall from the Morea, which had suffered keenly at the hands of the cruel Oriental. In Egypt he at once set himself afresh to the work of reorganization in army and navy, and in 1831, when Mehemet Ali ordered an almost unprovoked invasion of Syria, Ibrahim was again at the head of the Egyptian army. Unchecked by the loss of 5.000 men from cholera before leaving Egypt, he appeared suddenly on the Syrian coast, took Gaza, Jaffa and Kaiffa by surprise, and by November 29th had invested Acre. There he met with a stubborn resistance; twice in vain he attempted to carry the seaport by storm, and in the midst of the siege he was called away, to meet an army of relief, commanded by 'Osmán Pasha, governor of Aleppo. Near Tripoli he surprised 'Osmán, who decamped without fighting, and returning hastily to Acre, he threw his whole force on the place, carrying it (May 27, 1832) with a loss of 1,400 men. Without a pause he marched on Damascus, which offered no resistance. At Hims (July 28) he encountered and defeated a Turkish army of 30,000 men, with a force of 16,000, and passing swiftly through the defiles of Beylán, overtook and completely routed the retreating enemy at Adaneh. Another victory followed at Oulou-Kisláк, and then, near Konieh, Ibrahim was met by the vizier Resheed Pasha at the head of 60,000 men. Favored by a murky day—an advantage which helped to counterbalance the great disparity of his forces—he contrived to throw the Turkish army into confusion, and, by the capture of the vizier, converted an impending disaster into the most brilliant of his victories. Meantime his fleet, equally successful, had chased that of the sultan back to the Bosphorus, and the victor, without any army to oppose him, was within six marches of Constantinople. At the critical moment the order came from Mehemet Ali to await reënforcements. But before these arrived the golden opportunity was lost. The Russian army and fleet advanced to the protection of the Ottoman capital; the other Western powers combined in the effort to effect peace; and by treaty in February, 1833, Syria and Adana were handed over to Mehemet on the condition of his paying tribute for them. As governor, Ibrahim reduced the new territory to order, and gave a strong impulse to industrial enterprise. But war again broke out in 1839, and at Nezeeb (June 24th) Ibrahim dealt a second deadly blow to the Turkish power. Again the commands of Mehemet forbade him to follow up his success, and the campaign, cut short by the interference of the British, ended in the restoration of Syria to the Porte in 1841. After his retreat from Damascus, achieved with martial skill, although accompanied with serious losses, Ibrahim laid down his sword. Retiring to his estates in the plain of Heliopolis, he occupied himself in establishing cotton and olive plantations, till in 1844 he was called to succeed his father as viceroy. He died at Cairo, November 9, 1848, only a few months after the formal confirmation of his rank of viceroy.

IBRAILA, BRAILA, BRAHILOW, or BRAILOW, a town formerly of Wallachia, now of Roumania, situated on the left bank of the Danube, about nine miles south of Galatz and 102 miles from the Sulina mouth of the river.

IBYCUS, a Greek lyric poet, who flourished about the sixtieth Olympiad—540 B.C.—was a native of Rhegium in Italy, but spent the greater part of his life at the court of Polycrates, tyrant of Samos. A curious story, not always accepted, is told in connection with his death. While traveling in the neighborhood of Corinth, the poet was waylaid and mortally wounded by robbers. As he lay dying on the ground, he saw a flock of cranes flying overhead, and called upon them to avenge his death. The murderers betook themselves to Corinth, and soon after, while sitting in the theater, saw the cranes hovering above. One of them, either in alarm or jest, ejaculated, "Behold the avengers of Ibycus," and thus gave the clue to the detection of the crime. The phrase, "the cranes of Ibycus," passed into a proverb among the Greeks.

ICA, YCA, or ECCA, an inland city of Peru, capital of a district in the department of Lima, situated 170 miles south-southeast of the city of Lima, and forty-eight miles south-southwest of the city of Pisco on the Pacific Ocean, with which it is connected by a railway. Between Pisco and Ica the country is a desolate and barren desert, but Ica itself lies in a fruitful valley surrounded by cornfields and vineyards. Pop., 7,000.

ICE is the solid crystalline form which water assumes when exposed to a sufficiently low temperature. It is frequently precipitated from the air as hoarfrost, snow, or hail; and in the glaciers and snows of lofty mountain systems or of regions of high latitude it exists on a gigantic scale, being especially characteristic of the seas and lands around the poles, which consequently have hitherto been practically inaccessible to man. Also in various parts of the world, especially in France and Italy, great quantities of ice form in caves, which, in virtue of their depth below the earth's surface, their height above the sea-level, or their exposure to suitable winds or to two or more of these conditions in combination, are unaffected by ordinary climatic changes, so that the mean annual temperature is sufficiently low to insure the permanency of the ice. The great ice supply for the island of Teneriffe is obtained from such a cave, which is 100 feet long, 30 feet broad, and from 10 to 15 feet high, and which is situated on a peak some 10,000 feet above the sea-level. According to the Rev. S. Browne such cave-ice is generally peculiar in its columnar appearance, and apparently less easy to melt than ordinary surface ice.

In the mutual transformations of water and ice, many remarkable physical phenomena occur. Thus, during the process of melting a block of ice or of freezing a quantity of water, no change of temperature can take place so long as there is a thorough mixture of water and ice. Consequently, the "freezing point" or temperature at which water freezes is a temperature so readily determined that it is conveniently employed as one of the standard temperatures in the graduation of ordinary thermometer scales, such as the centigrade, the Fahrenheit, and the Réaumur. In the act of freezing, water, though its temperature remains unchanged, undergoes a remarkable expansion or increase of bulk, so that ice at 0° C. is less dense than water—a fact demonstrated at once by its power of floating. "Ground-ice" or "anchor-ice," which forms in certain circumstances at the bottom of streams, is only an apparent exception to this relation between the densities of water in its solid and liquid states, being retained there by the cohesion between it and the stones or rocks which compose the river's bed. When forcibly released from this contact with the bottom, the ice at once ascends to the surface. Ground-ice may thus be the lowest stratum of the once completely frozen mass of water, adhering to the bottom during the thawing and melting of the ice at the surface; or it may even be formed under favorable conditions below briskly flowing water, probably by the action of eddies, which draw the surface water down through the warmer but denser liquid, and thus cool the stones and rocks at the bottom. As water then expands on freezing, so conversely ice contracts on melting; and the ice-cold water thus formed continues to contract when heated until it has reached its point of maximum density. Joule, from a series of careful experiments, determined the temperature at which water attains its maximum density to be 39.1° Fahr., or very nearly 4° C. Hence water contracts as its temperature rises from 0° C. to 4° C.; but at higher temperatures it behaves like the great majority of other substances, expanding with rise of temperature. At no temperature, however, does water in the liquid state become less dense than ice.

Under the influence of heat, ice itself behaves as most solids do, contracting when cool, expanding when heated.

The growing demand for ice for domestic, medicinal, and other purposes has led, not only to the development of a regularly organized ice-trade, but also to the invention of machines for the manufacture of ice in countries which do not possess a sufficient home supply. Freezing-mixtures, such as the familiar snow and salt or the mixture of sulphate or phosphate of sodium and dilute nitric acid, may be dismissed with a word, since they are restricted in use to the production of intense cold for a brief period of time, and are incapable of economic application to the formation of large quantities of ice.

ICE MAKING AND MACHINE REFRIGERATION.

The manufacture of ice has now become a regular industry in the temperate as well as the tropical climates. The art is really old having been experimented with nearly a century ago in England and on the continent, and ice has long been made in India without other than natural means. Several mild winters in succession, as those of '89, '90, '91, probably stimulated experiment to the point of final commercial success.

The physical fact upon which the later manufactures of ice and the production of cold for storage purposes depend is that when a liquid evaporates it uses up all the heat it can get in its vicinity. The ice machine does not make any cold; it does not *produce* cold in any substance. It only extracts the heat therefrom. This cooling action can be illustrated by very simple experiments, such as the pouring of a little ether on the land. As it evaporates there will be a decided sensation of coldness. If a bottle of water is kept wet outside with ether the water will continually grow cooler, and may eventually be frozen. If a porous earthen jar, through which the water from the interior continually oozes, be placed in the shade in warm weather, the continual evaporation from the outside surface cools perceptibly the jar and water, and this contrivance for cooling water is of very ancient date in warm countries. Before the invention of the modern ice machines, which are used in practically the same forms both for manufacturing ice and for cooling rooms for cold storage, water was frozen in bottles for daily use by setting them in trays of brine to the sides of which were attached coils or tanks for ether-vapor. The vapor cooled the brine, and the water in the bottles could be finally frozen.

But in modern machines ether is not used, being too expensive, and also inflammable. Sulphurous oxide or ammonia takes its place. What is commonly called ammonia is more properly ammonia water; that is, water with several hundred times its volume of ammonia gas dissolved in it. But in ice making anhydrous ammonia is used—ammonia free from water. By all processes, which in reality vary but little, the first thing to do is to get the ammonia into liquid form, since by its again becoming vapor the cold is produced. There are two ways of condensing a vapor into a liquid, one being by pressure and the other by cold. It is easiest done by combining these two. After the ammonia is subjected to great pressure it is forced through a coil of pipe where it is cooled by water running over the coil. This coil is small enough to be filled by the ammonia under pressure. To be used so as to exert its cooling effect it is let into pipes larger than the liquid can fill. It immediately vaporizes in these pipes, and they become very cold. If they were carried round and round the walls of a room, or were laid in continuous coils in the walls, the room would become cold, and would remain so while the process was continued, and this would be cold storage.

There are two systems now in common use, with differences in mechanical appliances in each. One is the "compression system," the other the "absorption system." The first is the more common at present, and is that of which the preliminary steps are described above. In this the machinery consists of a powerful pump driven by steam, connected with the condensers, piping, etc. We will suppose that the purpose of this machine is the manufacture of ice to take the place of the natural product in daily use. Liquid ammonia, not the ammonia with water mentioned, but the ammonia liquefied by compression, is the first necessity. This is furnished by the makers of ice machines in strong iron cylinders, or a part of the plant of the ice factory may be devoted to the production of it. This is run into an iron tank, from which it is allowed to pass into the coils of pipe in the freezing tanks. These would be of iron, say twenty by fifty feet in size, and four feet deep. Covering this tank is a floor, which is cut in square holes with rectangular covers. Each of these holds a can which is the size of the block of ice to be frozen in it. The tank contains brine of a regulated strength. This brine is an indispensable of the ice-making process because brine will contain, hold, carry cold, and itself remain unfrozen at the temperature at which water freezes. Its use is familiar in the common process of making ice cream. The square cans stand in this brine, reaching nearly to the bottom of the tank. Across the interior of the tank, passing back and forth, are the pipes, or the continuous pipe, into which the compressed ammonia has been admitted. Being large enough to contain the ammonia in its gaseous form they become very cold, and the brine surrounding them often reaches a temperature of 15° or 18° Fahr. This brine in the freezing tank is kept in constant circulation by agitators worked by appropriate machinery, so that all the cans containing water to be frozen may have temperatures alike. In an arrangement of this kind it requires from two and one-half to three days to freeze the water in the cans to a solid clearness.

When frozen it is plain that each can will contain one solid block of clear ice the exact size of its interior. A traveling crane lifts them out one at a time and carries them to one side where a little stream of warm water, or a momentary dipping in a tank of warm water, makes the ice loose enough to slip out. This part of the process may be automatic, or nearly so, and the blocks of ice are then ready for use in the usual way.

But the freezing process must be continuous, and a great portion of the machinery of the plant is devoted to making it so. After expanding in the pipes described, and cooling them and the brine around them, the ammonia, now a gas again, is drawn through a pipe into a great pump. The return stroke of the piston compresses it again, and forces it out through a pipe which leads into a condenser. This condenser also consists of coils of pipe, over which cold water is kept running. After the ammonia becomes again liquefied it is let into the storage tank, where the operation began, let from there again into the coils of freezing pipe, and so the operation goes on continually, with the same ammonia used over and over. Machinery of the best kind is necessary in the performance of this seeming miracle, and it was not until it was produced that the process became economically or commercially possible. It is now a common process. There is a great advantage in thus producing commercial ice. All that is obtained from natural sources, such as frozen ponds, lakes, rivers, etc., is more or less infected with disease germs. The water used in making the artificial ice may be, and usually is, distilled and then condensed, or distilled and filtered, and may be absolutely pure.

Ammonia is not the only gas which is used in making ice. Sulphurous oxide is often employed. This is the suffocating gas which is produced when sulphur is burned. The ice machine using this works in essentially the same way that one using ammonia does, by compression and by using the oxide over and over. In this variety of machine a brine made of some other material than common salt may be used, such as magnesium chloride. There may also be slight differences in engines, compressers, etc. As a matter of fact the details of ice-making machinery vary as they do in all other cases, the essentials, for the purpose to be accomplished, remaining the same.

The other class of ammonia ice-making machines operates on what is called the "absorption system." The operation starts in this case with the fluid usually called ammonia, that is, ammonia-water, alluded to above. This liquid is heated in a boiler, and steam and ammonia-gas are driven off from it together. This mixture, or steam, passes into a receptacle where the steam of the water is condensed, and passes back into the boiler, the ammonia-gas passes on into the condenser. Here it is liquefied by pressure and cold, as described in the former case, except that the pressure is not made mechanically by a piston, but by the expansive force of the vapor that is constantly being driven out of the boiler. The work then done by it is the same as that in the process first described. After doing its work in the freezing pipes the ammonia is again absorbed by the water it was driven out of at first. The solution of ammonia, ammonia-water, is again used as before. The reabsorption and repeated expulsion gives the name to the process.

Cold Storage.—This is the name now given to the use of the ice machine in cooling large rooms where all kinds of perishable goods, meats, fruits, vegetables, etc., are stored, and remain fresh in a changeless temperature so low that decay does not occur. This is now much the most extensive use of the ice machine, and has in recent years proven one of the most useful and economical of all industrial improvements. No ice is in this case made. If an extensive coil of pipes in a tank may be made so cold that the brine around may be made to freeze water in cans, it is manifest that the same pipes must absorb the heat from air which is in contact with them, and make it cool. These pipes may be coiled in immense length around the sides of a warehouse, as they were in the tank, and all the air coming in contact will be gradually cooled as the brine was. This, in its simplest terms, is cold storage. There are different systems, varying in detail but not in principle. Machines are now extensively used in steamers for the purpose of preserving fresh meat in voyages of thousands of miles. Small machines are constructed to cool rooms in hospital wards, and many have been made to cool the chambers in hotels just as steam-pipes in winter warm them, The plan is entirely practicable for the dwellings of people whose means enable them to maintain the plant, and as time passes the process must be simplified and cheapened.

One of the surprising results of the refrigeration development has been in engineering. It was first used by a German engineer in 1883, and the process consists in freezing quicksands, loose wet gravel, and even water, so that it may be dug with a pick and thrown out. This, it will be seen, obviates the necessity of sinking caissons, of piping shafts, of lining tunnels, as they are made. The work, in sinking a shaft, consists in driving down pipes about eight inches in diameter in a circle around the place of the intended excavation. Brine which has been made very cold, say to zero, Fahr., is sent down through a pipe which is inside the outer and large pipe, returning through the space between the inner and outer pipes. By this means a circle of frozen water, quicksand, or wet gravel is made, which may be excavated, and a lining put in place- This is a quick solution of one of the standing difficulties in tunneling, mining, and bridge-building.

ICEBERG, a floating mass of ice, which has broken off from such ice sheets as cover Greenland, Spitzbergen, and other polar lands, constituting vast glacier systems ever creeping out and down from the central heights to the shores. As the glacier is pushed out to sea, the lower margin is exposed to the destructive action of the waves, and breaks up into fragments of endless variety of form. These severed blocks, many of which are hundreds of millions of tons in mass, drift to lower latitudes under the influence of polar currents, and gradually melt way in the warmer water. Such is the natural history of icebergs, which, in their freshwater origin, are to be distinguished from the ice fields, ice floes, pack ice, and ice hummocks, so familiar to the polar voyager. The iceberg, as it drifts along, melts most rapidly under water; and this unequal wasting must be accompanied by a change in the position of the center of the mass and a consequent shifting of the iceberg into its new position of equilibrium. Undermining and fracture also result; so that at length the mass of ice, however square-shaped or symmetrical it may have been originally, assumes a form irregular and fantastic in the extreme. The densities of ice and sea-water are nearly .92 and 1.03 respectively, so that only $\frac{11}{103}$ or nearly $\frac{1}{9}$ of the iceberg is above water and visible. An iceberg observed by Sir John Ross and Lieutenant Parry was $2\frac{1}{2}$ miles long, $2\frac{1}{5}$ miles broad, and 153 feet high. Assuming the form to have been approximately a cone erected upon an elliptic base, the mass above water would be roughly 150,000,000 tons—giving a total mass of nearly 1,500,000,000 tons. This iceberg, however, was by no means of extraordinary dimensions. In the southern seas, great fleets of icebergs have been observed as far north as the latitude of Cape Horn; and some of these ice masses have towered to a height of 700 or 800 feet. The limiting latitude to which icebergs drift is lower in the southern than in the northern hemisphere, probably because of the comparative scarcity of land in the south polar regions.

ICE-HOUSE. An ice-house, to supply ice for domestic use during the summer months, is one of the desirable adjuncts of a country residence. The old form of ice-house was a well several feet deep, dug out on a sloping ground or against a bank. The bottom was made to slope toward a sunk drain, covered by an iron grating, to permit the water from the melted ice to pass away quickly; while a dip in the drain or a bend in the pipe prevented air from entering at the bottom of the well. The ice was filled in through an opening in the dome, which had to be carefully closed.

The Americans, who use large quantities of ice, commonly store it above ground. The house may be twelve feet square, or any larger size. A series of posts in pairs are set up one and one-half feet apart and eight feet high, about one foot being inserted firmly in the ground; the distance between each pair is three feet. The tops being cut level all round, a plate six inches wide and four to six inches deep is spiked on to each line of posts, the two plates being strongly stayed by cross pieces so as to form a double frame. The inner face of each line of posts is now boarded up closely, leaving a space six and one-half feet by three feet at the sides, which are also boarded, to form a door-casing on each side. The spaces between the two lines of boards thus form a continuous box, which is to be completely filled up with moist tan-bark or sawdust well packed throughout. There must be a drain to carry off all water from the interior. Within the inclosed space some level joists are laid down, and on them loose planks to form a floor, which, when covered one foot thick with straw is ready to receive the ice. The roof is formed of rafters, four inches by three, long enough to project at least four feet outside the plates, to which they must be well secured by spikes. The rafters are to be boarded over and covered with shingle, and a small opening left at the top to admit a pipe eight inches in diameter for a ventilator, over which a small ornamental cap, supported on four little posts, is to be placed. As a finish to the projecting roof, brackets of three by four-inch scantling, if the joists are of sawed stuff, or of rough limbs of trees to match the posts, if these are rough, may be introduced. After the ice is stored, a close floor of boards should be laid on joists, resting loosely on the wall plate (to admit of this upper floor being removed while the house is being filled), and they must be covered with six inches of tan or sawdust, or, failing these, with straw. A good layer of tan or sawdust should also be placed on the top of the ice when it is put in. There should be two doors, inside and outside the lining, both opening outward. A shady place is desirable, but not essential. The enormous warehouses for the storage of ice sold in summer in American cities by the firms dealing in the commodity consist of buildings on these principles, the essential points being the exclusion (as far as possible) of air and the maintenance of uniform interior temperature.

ICELAND (in Danish, *Island*) is an island in the North Atlantic Ocean, immediately to the south of the polar circle. Its distance from the north of Scotland is 500 miles, from Norway 600 miles, and from Greenland 250 miles. The greatest length of the island is 300 miles, from east to west, and its greatest breadth 200 miles. The area is estimated at 39,756 square miles, 7,000 more than that of Ireland.

The geological formation of the island is throughout volcanic. The whole island seems to have been filled up by volcanic agency. In some of the mountains the lavas occur in tolerably regular parallel strata or terraces, separated here and there by layers containing lignite, as in the similar volcanic plateaus of Faroë and Greenland.

The whole of the south coast, from Hornafjörour in southeast to Reykjanes in the southwest, is entirely unbroken by bays or firths. If such ever existed, they have been filled up by the glaciers and the sand and mud carried down from the volcanic ice-mountains situated close to the south coast. The coast line is not, however, a straight line, but a broad arch, as the land swells out in the middle southward to a considerable extent.

The center of the island is a table land, or rather a broad flattened ridge, sloping down to the north and south, the average height of which above the level of the sea is about 2,000 feet.

The southern and part of the eastern coasts of Faxaflói, as far as Reykjavík, are very barren and desolate, being almost entirely rugged lava tracts; but the lower parts of the hills then begin to be clothed with grass, affording pasture for sheep, cattle, and horses. The northwest peninsula consists of narrow firths divided by high and narrow mountain ridges, seldom lower than 2,000 feet. In some places the top is a thin rocky edge; in others it consists of sharp-pointed peaks, denuded of all vegetation. Even at a considerable distance the different rocky strata may be distinguished. Sometimes these hills, or rather cliffs, rise perpendicularly out of the water to a height of a couple of thousand feet, affording breeding-places to an immense number of sea-fowl. More frequently the lower parts of these razor-backed hills slope toward the firths, the stony slopes being partly covered with grass or heather. The farms are therefore found along the shores and in short valleys cutting into the hills from the ends of the firths. The east coasts of Iceland present exactly the same character as that of the northwest peninsula. From the end of Eyafjörour a long and fertile valley, bounded on both sides by lofty mountains, runs due south into the country for about twenty-five miles. The northeast corner of the island, called Pingeyarsysla, has good sheep pasturage, although its hills and slopes are covered with heather instead of grass to a greater extent than most other districts of the island. It will thus be seen that the inhabited parts run round the coasts, and from the end of the bays into the interior, the farms farthest inland being about fifty miles from the sea.

As the snow-line is at an altitude of from 2,500 to 3,000 feet, all the highest mountain-tops are cones covered with perpetual snow.

Most of the mountains of Iceland have been volcanoes, and at least twenty-five of them have been active within the historical period of the island, that is. the last 1,000 years.

Of the existing volcanic mountains the best known is Hecla, from which eighteen eruptions have been recorded; the last took place in 1845-46. The intervals between the eruptions have varied greatly; sometimes it has remained quiet for six years only, at other times for seventy-two years. As with most other volcanoes, the height of this mountain varies with the eruptions. Thus before the eruption of 1845 its height was given on Gunlaugsson's map as 4,951 feet, while Kjerulf measured the mountain in 1850, and found it to be only 4,532 feet. The earliest historical eruption, that of 1104, is celebrated as the "sand-rain winter," the second, in 1158, as the "great darkness," from the quantity of ashes ejected. One feature of the Icelandic eruptions, not from Hecla only, but from other orifices in the island, has been the prodigious quantity of fine dust discharged and the great distance to which this material has been carried. Thus in the year 1766 a column of ashes rose out of the crater of Hecla to a height of 16,000 feet into the air. Volcanic dust from the Icelandic vents has frequently been borne by upper air currents so as to fall upon the Faroë Islands, and has even been carried in considerable quantities as far as Norway, on the one side, and the north of Scotland, on the other. Next to Hecla, the Katla, or Kötlugjá, in Myrdalsjökull may be mentioned; its last eruption (the thirteenth known) took place in 1860. The most tremendous volcanic outbreak in Iceland was that which took place in 1783 in or near the Skaptárjökull, on the northwest border of the Vatnajökull. Two principal lava streams flowed from it; one of them was fifty miles in length, from twelve to fifteen miles in breadth, and 100 feet deep, and the other was forty miles in length. It has been calculated that these two streams cover an area of 420 square miles. This eruption destroyed, directly or indirectly, one-sixth of the inhabitants of the whole island, and one-half of all the live stock. From nearly all the outliers of the Vatnajökull eruptions now and then take place. To the north of Vatnajökull a range of volcanic centers extends as far as Myvatn. The last outbreak here took place in 1875, when fine volcanic dust was discharged in great quantity, some of it being carried as far as Norway. The sea around the coasts of Iceland has been frequently disturbed by volcanic outbreaks, especially off Cape Reykjanes.

On account of the same volcanic activity, hot springs are frequently met with throughout the island. The common name for them in Icelandic is "hverr" (caldron). The chief of these hot springs is Geysir (Gusher). (See GEYSERS.)

The only mineral worked to any extent in Iceland is sulphur; the principal mines are those of Krísuvík and Myvatn.

Iceland is rich in streams and rivers, some of them carrying a large volume of water; as, however, the fall is steep in every case, they are not navigable even by small boats.

The climate of Iceland is not nearly so severe as might be supposed from the latitude. One feature in the climate has been noticed by all travelers, that is, the clearness and purity of the atmosphere, rivaling that of Italy, mountains being seen distinctly at a distance of 100 miles. The rainfall is considerable in the south and the east of the island, and snowstorms and gales are frequent in winter. Thunderstorms occur mostly in winter.

No cereal is grown in Iceland, but in some places there is found a kind of wild oats, called in Icelandic "melur." Potatoes, carrots, turnips, and several kinds of cabbage have lately been cultivated with considerable success. The grasses, wild and cultivated, are of the greatest importance to the inhabitants. The only trees found are the dwarf birch, rarely higher than twelve feet, and some willow and juniper bushes. The wild flora of Iceland is small and delicate, with bright bloom, the heaths being especially admired. Wild crowberries and bilberries are the only kind of fruit found in the island.

The only wild animal in Iceland is the fox, of which both white and blue varieties occur; they are hunted for their skins, and also because they often attack the sheep. The domestic animals are the cow, the horse, the sheep, the dog, and the cat. The cows are of a small breed, resembling English shorthorns in general, and especially Alderneys. The horses are also of a small breed, the average height being twelve hands; they are hardy and enduring; many of them are never housed, and forage for themselves as best they can throughout the winter. They are exported to Great Britain in considerable numbers, for use in the coal mines. The sheep generally are of nearly the same size as the Scotch black-faced sheep; they are not infrequently seen with three or four horns. The genuine Iceland dog, with his pointed snout, short ears, curled tail, and short legs, has some resemblance to the Esquimaux dog and the Scotch collie Reindeer were imported in the last century, but they fled to the mountains and became wild; they are now nearly extinct. There are said to be ninety different species of birds, fifty-four of them being water-fowl. The most remarkable of the birds of prey are he Icelandic falcon (*Falco islandicus*) and the eagle. The only game bird is the ptarmigan, which is brown in summer and white in winter. Of the water-fowl the eider duck is of the greatest importance on account of its valuable down; the killing of it is therefore forbidden by law. Immense numbers of gulls, puffins, and guillemots are seen near their breeding places on the small islands and on the cliffs round the coasts. The hooper, or whistling swan, is found in large numbers in Iceland. The sea round the coast teems with cod, haddock, halibut, and the basking shark; the fin-backed whale and seals of various kinds are also met with, but in smaller numbers. In the lakes and rivers, salmon and trout are caught in considerable quantities.

As no corn is grown, there is no agriculture to speak of, and only a little spade husbandry connected with the cultivation of kitchen gardens, where potatoes, turnips, and carrots are grown. The area thus under cultivation covers, according to the latest official returns, about 215 English acres throughout the island.

The manufactures are confined to spinning, weaving and knitting the wool of the sheep. A sort of tweed is the principal clothing of the inhabitants. The spinning of the yarn is done by the women in winter, and almost every farm has an old-fashioned loom. In the north considerable quantities of jackets and stockings are knitted and exported.

The trade with Iceland is entirely in the hands of Danish traders and a few Icelanders—who mostly reside in Copenhagen It consists almost entirely in exchange, or barter. The principal exports of the Icelanders are cod fish, about 6,000,000 pounds annually; train oil 9,500 barrels; wool, 1,500,000 pounds; eider down, 7,000 pounds; and feathers, 20,000 pounds. Ponies are now exported to Scotland—about 2,000 a year; and a few cargoes of live sheep have been sent over during the last few years. All bread stuffs have to be imported, as well as groceries, spirits, wines and beer, tobacco, salt, building materials, and other items. Since 1854 the trade has been open to all nations.

There being no roads in the island, but merely tracks trodden down by the feet of the ponies, there are no carts nor carriages of any description. In the firths boats are chiefly used for conveying goods and passengers; but all inland communication and conveyance are by ponies. These hardy animals carry each a burden of about 200 pounds weight, under which they walk about twenty-five miles a day. All traveling is also on ponies; two are considered necessary for every traveler, and on them he can make from thirty to forty miles a day.

Iceland is subject to the king of Denmark. According to the constitution granted to Iceland in 1874, the king shares the legislative power with the Al-thing, an assembly of thirty-six members, thirty of whom are elected by household suffrage, and six nominated by the king. The Al-thing meets every second year, and sits in two divisions, the upper and the lower. The upper division consists of the six members nominated by the king and six elected by the representatives of the people out of their own body. The lower division consists of the remaining twenty-four representative members.

The administration of justice is carried out in the first instance by the sheriffs. From the sheriff courts appeals lie to the superior court at Reykjavík, consisting of three judges. Appeals may be taken in all criminal cases and most civil cases from this court to the supreme court at Copenhagen.

The state church of Iceland is the Lutheran; and all the Icelanders, without exception, belong to it. One bishop and 141 clergymen minister to the spiritual wants of the islanders. The bishop is appointed by the king. The parishes are 290, but the livings are only 141, from which it may be seen that many ministers have to serve two, and some even three parishes. The king appoints some of the ministers, and the governor-general others, with the advice of the bishop. The ministers are paid partly from the revenues of church property, and partly from tithes.

The Icelanders have long been famous for their education and learning, and it is no exaggeration to say that in no other country is such an amount of information found among the classes which occupy a similar position. A child of ten unable to read is not to be found from one end of the island to another. A peasant understanding several languages is no rarity, and the amount of general information which they possess might be envied by many who have had greater facilities for acquiring knowledge. Till within the last few years there were no elementary schools in the island; all children were taught by their parents or near neighbors. Now a few elementary schools have been started, but their number is still too small to make any general difference in the education. For classical and general education there is a college at Reykjavík, with seven professors and about 100 students. There is also a college for ministers, with three professors. The general physician of the island, assisted by two medical men, gives lectures to medical students; but those who propose to enter the legal profession have to attend the university of Copenhagen.

There is less difference in the material prosperity of the Icelanders than in that of the inhabitants of more advanced countries. One does not find the abject poverty so often seen in large towns and among the agricultural population of some of the most civilized countries of Europe. On the other hand, wealthy men, or owners of extensive properties, are unknown, the richest man in Iceland deriving only £300 a year from his property.

The census of 1870 returned the population of the island as 69,763. In 1801 the population was only 46,240; in 1898 it was found to have increased to 70,927. The birth-rate is about thirty-three per thousand, and the death rate twenty-four. Nearly the whole of the population live on isolated farms, the number of each family, including servants, being on an average seven. The chief town or village is Reykjavík, with about 2500 inhabitants. It is the seat of the governor-general, the bishop, the colleges, and the superior court.

Shortly after the discovery of Iceland by the Scandinavians, *c.* 850 (it had long been inhabited by a small colony of Irish Culdees), a stream of immigration set in toward it, which lasted for sixty years, and resulted in the establishment of some 4,000 homesteads scattered round the habitable fringe about the great bays and firths.

In this immigration three distinct streams can be traced. (1) About 870–890 four great noblemen from Norway, Ingolf, Ketil Hæng, Skalla-Grim and Thorolf, settled with their dependants in the southwest of the new found land. (2) In 890–900 there came from the Western Islands Queen Aud, widow of Olaf the White, king of Dublin, preceded and followed by a number of her kinsmen and relations (many like herself being Christians), Helgi Biolan, Biorn the Eastern, Helgi the Lean, Ketil the Foolish, etc., who settled the best land in the island (west, northwest, and north), and founded families who long swayed its destinies. Besides this most important immigration of all there came from the Western Islands a fellowship of vikings seeking a free home in the north. They had colonized the west in the viking times; they had "fought at Hafursfirth," helping their stay-at-home kinsmen against the centralization of the great head-king, who, when he had crushed opposition in Norway, sailed after these turbulent colonists across the North Sea, and followed up his victory by compelling them to bow to his rule or fly again to fresh haunts whence they could not so easily interfere with his projects. Such were Ingimund the Old, Geirmund Hellskin, Thord Beardie (who had wed St. Edmund's grand-daughter), Audun Shackle, Bryniulf the Old, Uni, to whom Harold promised the earldom of the new land if he could make the settlers acknowledge him as king, a hopeless project, and others by whom the northwest, north and east were almost completely "claimed." (3) In 900–930 a few more incomers direct from Norway completed the settlement of the south, northeast and southeast. Among them were Earl Hrollaug (half brother of Hrolf Ganger and of the first earl of Orkney), Hialti, Hrafnkel, Frey's priest, and the sons of Asbiorn. Fully three-quarters of the land was settled from the west, and among these immigrants there was no small proportion of Irish blood. In 1100 there were 4,500 franklins, *i.e.*, about 50,000 souls.

The unit of Icelandic politics is the homestead with its franklin-owner (*buendi*), its primal organization the hundred-moot (*thing*), its tie the *goδorδ* or chieftainship. The chief who had led a band of kinsmen and dependants to the new land, taken a "claim" there, and parceled it out freely among them, naturally became their leader, presiding as priest at the temple feasts and sacrifices of heathen times, acting as president and speaker of their moot, and as their responsible representative toward the neighboring chiefs and their clients. He was not a feudal lord nor a local sheriff, for any franklin could change his goδorδ when he would, and the rights of "judgment by peers" were in full use; moreover, the office could be bequeathed, sold, divided, or pledged by the possessor; still the goδi had considerable power and influence as long as the commonwealth lasted.

At first there was no higher organization, but disputes between neighboring chiefs and their clients, and uncertainty as to the law, brought about the *Constitution* *of Ulfliot*, *c.* 930, which appointed a central moot for the whole island, the Al-thing, and a speaker to speak a single "law" (principally that followed by the Gula-moot in Norway); the *Reforms of Thord Gellir*, 964, settling a fixed number of local moots and chieftaincies, dividing the island into four quarters (thus characterized by Ari:—north, thickest settled, most famous; east, first completely settled; south, best land and greatest chiefs; west, remarkable for noble families), to each of which a head-court, the "quarter-court," was assigned; and the *Innovations of Skapti* (ascribed in the saga to Nial) *the Law-Speaker* (d. 1030), who set up a "fifth court" as the ultimate tribunal in criminal matters, and strengthened the community against the chiefs. But here constitutional growth ceased; the law-making body made few and unimportant modifications of custom; the courts were still too weak for the chiefs who misused and defied them; the speaker's power was not sufficiently supported to enable him to be any more than a highly respected lord chief justice, whereas he ought to have become a *justiza* if anarchy was to be avoided; even the ecclesiastical innovations, while they secured peace for a time, provoked in the end the struggles which put an end to the commonwealth.

Christianity was introduced *c.* 1000. Tithes were established in 1096, and an ecclesiastical code made *c.* 1125.

The first disputes about the jurisdiction of the clergy were moved by Gudmund in the thirteenth century, bringing on a civil war, while the questions of patronage and rights over glebe and mortmainland occupied Bishop Arni and his adversaries fifty years afterward, when the land was under Norwegian viceroys and Norwegian law. For the civil war of the thirteenth century broke down and exterminated the great houses who had monoplized the chieftaincies and abused their power for their own ends; and after violent struggles (in which the Sturlungs of the first generation perished at Orlygstad, 1238, and Rekiaholt, 1241, while of the second generation Thord Kakali was called away by the king in 1250, and Thorgils Skardi slain in 1258) the submission of the island, quarter after quarter, took place in 1262–64, under Gizur's auspices, and the old Common Law was replaced by the New Norse Code "Ironside" in 1271.

The mediæval Icelandic church had two bishoprics, Skalholt (south, west, and east) 1056, and Holar (north) 1106, and about 175 parishes (two-thirds of which belonged to the southern bishopric). The bishops, elected by the people at the Al-thing till 1237, enjoyed considerable power and influence, and were most of them distinguished men; two, Thorlak of Skalholt and John of Holar, were publicly voted saints at the Al-thing after due examination of their claims to that distinction, and one, Gudmund, received the title of "Good" by decree of the bishop and chapter.

Iceland was not agricultural but pastoral, depending upon flocks and herds for subsistence, for, though rye and other grain would grow in favored localities, the hay, self-sown, was the only regular crop. In some districts the fisheries and fowling were of importance, but nine-tenths of the population lived by their sheep and cattle, which gave them food, clothing, and such products for export as enabled them to import wood for building, iron for tools, and a few luxuries, as honey, wine, grain for brewing, and foreign clothes, fur, etc. Life on each homestead was regularly portioned out:—out-door occupations—fishing, shepherding, fowling, and the important hay-making and fuel-gathering—occupying the summer; while in-door business—weaving, tool-making, etc., filled up the long winter. The year was broken by the spring feasts and moots, the great Al-thing meeting at midsummer, the marriage and arval gatherings after the summer, and the long yule feasts at midwinter. There were but two degrees of men, free and unfree, though only the franklins had any political power; and, from the very nature of the life, social intercourse was peculiarly unrestrained and unfettered; goði and thrall lived the same lives, ate the same food, spoke the same tongue, and differed little in clothing or habits. The poorest franklin was the social equal of the proudest chief, and in a few generations the freedman or landless dependant might become their peer in public estimation, provided he got a homestead of his own. The thrall had a house of his own and was rather villein or serf than slave, having rights and a legal price by law. During the heathen days many of the great chiefs passed part of their lives in Norway at the king's court, but after the establishment of Christianity in Iceland they kept more at home, still visiting the Continent, however, for purposes of state, suits with clergy, etc. But the trade was from the first in foreign (Norse) hands almost entirely.

The introduction of a church system brought little change. The great families put their members into orders, and so continued to enjoy the profits of the land which they had given to the church; the priests married and otherwise behaved like the franklins around them in every-day matters, farming, trading, going to law like laymen; so that, in spite of the efforts of the more earnest church reformers, the church was powerless to promote centralization against the feuds and jealousies of the great houses.

The old life in the commonwealth was turbulent and anarchic, but free and varied; it produced men of mark, and fostered bravery, adventure, and progress. The great chiefs were indeed only greater franklins; but their wealth and comparative luxury gave them leisure and opportunities for culture which raised them as examples and leaders above their fellows; the pride of birth preserved a nobility of feeling and high standard of honor amid much of violence and chicane. But all this now ceased, and there was left but a low dead level of poor peasant proprietors without pride in the past, political interest in the present, or ambition of the future, careless of all save how to live by as little labor as possible, and pay as few taxes as they could to their foreign rulers. The island received a foreign governor, and was parceled out into local counties (*syslur*), administered by sheriffs (*syslumadr*) appointed by the king. A royal court took the place of the Al-thing courts; the local business of the local things was carried out by the (*hreppstjori*) bailiff, a subordinate of the sheriff; and the goðoð, things, quarter-courts, trial by jury, etc., were all completely swept away by these innovations, which have continued with mere changes of detail till the present century. The power of the crown was increased by the confiscation of the great Sturlung estates, which were under-leased to farmers, while the early falling off of the Norse trade threatened to deprive the island of the means of existence; for the great epidemics and eruptions of the fourteenth century had gravely attacked its pastoral wealth and ruined much of its pasture and fishery, for the time at least. The union of the Three Crowns transferred the practical rule of Iceland to Denmark in 1280, and the old Treaty of Union, by which the island had reserved its essential rights, was disregarded by the absolute Danish monarchs; but, though new taxation was imposed, it was rather their careless neglect than their too active interference that damaged Iceland's interests. But for an English trade, which sprung up out of the half-smuggling, half-buccaneering enterprise of the Bristol merchants, the island would have fared badly indeed, for during the whole fifteenth century their trade with England, exporting sulphur, eider down (which the English taught them the value of), wool, and salt stock-fish, and importing as before wood, iron, honey, wine, grain, and flax goods, was their only link with the outer world. This period of Iceland's existence is torpid and eventless; she had got peace, but with few of its blessings; all spirit seemed to have died with the commonwealth; even shepherding and such agriculture as there had been sank to a lower stage; wagons, plows and carts went out of use and knowledge; architecture in timber became a lost art, and the fine carved and painted halls of the heathen days were replaced by turf-walled barns half sunk in the earth, and lasting at best a generation; the large, decked luggers of the old days gave way to small, undecked fishing-boats; it is needless to add that letters were neglected, and that all remembrance of the commonwealth perished utterly.

The Reformation here as elsewhere had a one-sided effect: it wakened men's minds, opening new vistas of hope and new fields of thought, but it left their bodies and circumstances little changed, or, if at all, for the worse. Its necessary complement, a social and political revolution, never came to Iceland. The Hanse trade replaced the English for the worse; and the wretched Danish monopoly which succeeded it when the Danish kings began to act again with vigor, under the stimulus of European changes, was still less profitable. The glebes and hospital lands were a fresh power in the hands of the crown, and the subservient Lutheran clergy became the most powerful class in the island, while the bad system of under-leasing at rackrent and short lease with unsecured tenant right extended in this way over a great part, at least a quarter, of the better land, stopping any possible progress. The details of the religious change are uninteresting; nearly all who took active part in it on either side were men of low type, moved by personal motives rather than religious zeal; and though it should be noticed that the fires of martyrdom were never lighted in Iceland, the story of the easily accepted Reformation is not altogether a pleasant one. When it was once accomplished, the little knot of able men who came to the front for two or three generations, stirred by the new life that had been breathed into the age, did nobly in preserving the records of the past for a later time to value and appreciate, while Odd and Hallgrim exhibit the noblest impulses of their time.

A new plague, that of the English, Gascon, and Algerine pirates, marked the close of the sixteenth century and opening of the seventeenth, causing widespread panic and some devastation in 1579, 1613-16, and 1627. Nothing points more to the helplessness of the natives' condition than their powerlessness against these tiresome foes. But the eighteenth century is the most gloomy in Iceland's annals. Smallpox, famine, sheep disease, and the awful eruptions of 1765 and 1783 follow each other in terrible succession. Against such fearful visitations, which reduced the population by about a fourth, little could be done, and when the only man who might have roused the Icelanders from their misery, distress, and impoverishment, the noble and patriotic Eggert Olafsson, a hero of the old type, was drowned in full career in 1768, it is hardly to be wondered at that things grew from bad to worse, and that a listlessness and torpidity crept over the national character, the effects of which it is only beginning to shake off. The few literary men, whose work was done and whose books were published abroad, were only concerned with the past, and Jon Widalin is the one man of mark, beside Eggert Olafsson, who worked and wrote for his own generation.

Gradually the ideas which were agitating Europe crept through Scandinavia into Iceland, and, now that scholars and travelers of mark and influence had drawn attention to the island, its claims were more respectfully listened to. The Continental system, which, by its leading to the blockade of Denmark, threatened to starve Iceland, was neutralized by special action of the British Government. Trade and fishery grew a little brisker, and at length the turn came.

The rationalistic movement, an unlovely attempt at reform, headed by Magnus Stephenson, a patriotic, narrow-minded lawyer, did little good as far as church reform went, but was accompanied by a more successful effort to educate the people by means of bringing within their reach the practical knowledge of the day. A Useful Knowledge Society, such as Brougham delighted in, was formed and did some honest work. Newspapers and periodicals were published, and the very stir which the ecclesiastical disputes encouraged did good. When free trade came, and when the free constitution of Denmark had produced its legitimate effects, the intelligent and able endeavors of a few patriots such as Jon Sigurdsson were able to push on the next generation a step further, in spite of such physical obstacles as the sheep disease. Questions of a modern political complexion arose; the cattle export controversy and the great home rule struggle began. The intelligence of a people whose love for knowledge and mental attainments has always been high, seconded its leaders well, and after thirty years' agitation home rule was conceded in 1874. The absolute *syslumadr* and *hirdstjori* became popular officials assisted by elected boards. The *Al-thing*, a mere council of powerless delegates, was replaced by a representative assembly of two chambers (composed of thirty members chosen by a popular and wide suffrage, and six crown nominees) with legislative powers, and other reforms were comprised in this grant. Further political changes, such as the introduction of a jury system to replace the Danish umpire-and-assessor procedure, are now being considered by the liberal party. There are many peculiar circumstances present in the condition of Iceland, the absence of towns, equality of society in a sense which exists in no other European community, difficulty of communication, and the intense conservatism and dislike of activity or change which must necessarily characterize a community so long isolated and "forced into lazy habits for lack of opportunity." But that emigration should have begun, and families left the old home for Canada and the United States to seek a better climate, a richer soil, and the hopes of progress which are so distant at home, is certainly remarkable; and, if the difficulties which must surround emigrants who have never seen a road, a tree, or a plow, on their first taking up an agricultural life, are overcome, the results may be very important to the mother country.

ICELAND MOSS, a lichen, *Cetraria islandica* (Achar.), whose erect or ascending foliaceous habit gives it something of the appearance of a moss, whence probably the name. The thallus has a pale chestnut color, and grows to a height of from three to four inches, the branches being channeled or rolled into tubes, which terminate in flattened lobes with fringed edges. It grows abundantly in the mountainous regions of northern countries, and especially it is characteristic of the lava slopes and plains of the west and north of Iceland. As met with in commerce it is a light-gray harsh cartilaginous body, almost destitute of odor, and having a slightly bitter taste. It contains about 70 per cent. of lichenin or lichen-starch, a body isomeric with common starch, but wanting any appearance of structure. It also yields a peculiar modification of chlorophyll, called thallochlor, fumaric acid, licheno-stearic acid, and cetraric acid, to which last it owes its bitter taste. In medicine it is used as a mild tonic, and at the same time it forms a nutritious and easily digested amylaceous food, being used in place of starch in some preparations of cocoa. It is not, however, in great request; and even in Iceland it is only habitually resorted to in seasons of scarcity.

I-CHANG, or Y-CHANG, also called Y-LIN in some maps, a town of China, in the province of Hupeh one of the four new ports opened to foreign trade by treaty in 1877. Population, (1900), 35,000.

ICHNEUMON *(Herpestes)*, a genus of small carnivorous mammals belonging to the family *Viverridæ*, and resembling the true civets in the elongated weasel-like form of the body and in the shortness of the limbs. There are, according to Gray, twenty-two species of ichneumons, the great majority of which are confined to the African continent, the remainder occurring in Persia, India, and the Malay archipelago, and one, the Andalusian ichneumon, in the Sierra Morena of Spain, the last probably an African straggler. The Egyptian and Indian ichneumons are the forms best known. The former is an inhabitant of Egypt and the north of Africa, where it is known to foreign residents as "Pharaoh's rat." When full grown it is about the size of the domestic cat. It is covered with a fur of long harsh hairs of a tawny gray color, darker on the head and along the middle of the back, its legs reddish and its feet and tail black. It feeds on rats and mice, birds and reptiles, and for this reason is occasionally domesticated. Its fondness for eggs leads it to search for those of the crocodile, buried as these usually are beneath a thin covering of sand on the river banks; and its services in thus checking the multiplication of those reptiles were so appreciated by the ancient Egyptians that they regarded the ichneumon as a sacred animal, and when it died buried it, says Heredotus "in holy repositories." The Indian ichneumon or mungoos is considerably smaller than the Egyptian form; its fur is of a pale gray color, the hairs being largely white-ringed, while the cheeks and throat are more or less reddish. Like the preceding species, it is frequently domesticated, and is then put to a similar use. It is especially serviceable in India as a serpent killer, destroying not only the eggs and young of these creatures, but attacking without hesitation and killing the most venomous adult snakes. The fact that it invariably survives those encounters has led to the belief that it either enjoys immunity from the effects of snake poison, or that after being bitten it has recourse, as the Hindoos have always maintained, to the root of a plant as an antidote. Neither of these suppositions has stood the test of scientific examination, for it has been found that when actually bitten it falls a victim to the poison as rapidly as other animals, while there is no trustworthy evidence of its seeking a vegetable antidote. The truth seems to be that the mungoos by its exceeding agility and quickness of eye avoids the fangs of the snake while fixing its own teeth in the back of the reptile's neck. The whole Thanatophidia of India stand in awe of this tiny but tenacious mammal, and seek to escape from its presence. The mungoos, on the other hand, never hesitates to attack.

ICHNEUMON-FLY is a general name applied to parasitic insects of the section *Pupivora* (or *Entomophaga*), order *Hymenoptera*, from the typical genus *Ichneumon*, belonging to the chief family of that section—itself fancifully so called after the Egyptian mammal (*Herpestes*), notorious for its habit of destroying the eggs of reptiles. The species of the families *Ichneumonidæ*, *Braconidæ*, *Evaniidæ*, *Proctotrypidæ*, and *Chalcididæ* are often indiscriminately called "Ichneumons," but the term is perhaps properly applicable only to the first and second of these, which are respectively equivalent to the *Ichneumones genuini* and *I. adsciti* of older naturalists, chiefly differing in the former having two recurrent nerves to the anterior wing, while the latter has only one such nerve. The *Ichneumonidæ* proper are one of the most extensive groups of insects, and have been much studied by entomologists since the time of Linnæus and Gravenhorst. Their sexual differences of color, etc., are, however, often so great that fresh discoveries are constantly being made with regard to their true specific relations, as well as new species detected by biological observers. There are six subfamilies of the *Ichneumonidæ*, viz., the *Ichneumonides*, *Cryptides*, *Agriotypides*, *Ophionides*, *Tryphonides*, and *Pimplides*, differing considerably in size and facies, but united in the common attribute of being in their earlier stage parasitic upon other insects. They have all long, narrow bodies; a small free head with long filiform or setaceous antennæ, which are never elbowed, and have always more than sixteen joints; the abdomen attached to the thorax at its hinder extremity between the base of the posterior coxæ, and provided in the female with a straight ovipositor often exserted and very long; and the wings veined, with perfect cells on the disk of the front pair.

The parasitic habits above alluded to render these flies of very great importance in the economy of nature, as they effectually serve to check any inordinate increase in the numbers of injurious insects. Without their aid, indeed, it would in many cases be impossible for the agriculturist to hold his own against the ravages of his minute hexapod foes, whose habits are not sufficiently known to render artificial checks or destroying agents available. The females of all the species are constantly on the alert to discover the proper living food for their own larvæ, which are hatched from the eggs they deposit in or on the eggs, larvæ, or pupæ of other insects of all orders, chiefly *Lepidoptera*, the caterpillars of butterflies and moths being specially attacked (as also are spiders). Anyone who has watched insect life, even in a suburban garden, during summer, can hardly have failed to notice the busy way in which the parent ichneumon, a small, four-winged fly, with constantly vibrating antennæ, searches for her prey; and the clusters of minute cocoons around the remains of some unfortunate cabbage-butterfly caterpillar, which has had just enough vitality left in it to crawl instinctively to a proper place for undergoing that change to pupa which it will never make, must also have been observed by many. This is the work of *Apanteles* (or *Microgaster*) *glomeratus*, one of the *Braconidæ*, which in days past was a source of disquietude to naturalists, who believed that the life of the one defunct larva had *transmigrated* into the numerous smaller flies reared from it.

ICHTHYOLOGY is that branch of zoölogy which treats of the internal and external structure of fishes, their mode of life, and their distribution in space and time. According to the views generally adopted at present, all those Vertebrate animals are referred to the class of Fishes which combine the following characteristics: They live in water, and by means of gills or branchiæ breathe air dissolved in water; the heart consists of a single ventricle and single atrium; the limbs, if present, are modified into fins, supplemented by unpaired median fins; and the skin is either naked, or covered with scales or with osseous plates or bucklers. With few exceptions fishes are oviparous. There are, however, not a few members of this class which show a modification of one or more of these characteristics, and which, nevertheless, cannot be separated from it. The distinction between the class of Fishes and that of Batrachians is very slight indeed.

The commencement of the history of ichthyology coincides with that of zoölogy generally. Aristotle (384–322 B.C.) had a perfect knowledge of the general structure of fishes, which he clearly discriminates both from the aquatic animals with lungs and mammæ, *i.e.*, Cetaceans, and from the various groups of aquatic invertebrates. According to him, "the special characteristics of the true fishes consist in the branchiæ and fins, the majority having four fins, but those of an elongate form, as the eels, having two only. Some, as the *Murœna*, lack the fins altogether. The rays swim with their whole body, which is spread out. The branchiæ are sometimes furnished with an operculum, sometimes they are without one, as in the cartilaginous fishes. * * * No fish has hairs or feathers; most are covered with scales, but some have only a rough or a smooth skin. The tongue is hard, often toothed, and sometimes so much adherent that it seems to be wanting. The eyes have no lids, nor are any ears or nostrils visible, for what takes the place of nostrils is a blind cavity; nevertheless they have the senses of tasting, smelling, and hearing. All have blood. All scaly fishes are oviparous, but the cartilaginous fishes (with the exception of the sea-devil, which Aristotle places along with them) are viviparous. All have a heart, liver, and gall-bladder; but kidneys and urinary bladder are absent. They vary much in the structure of their intestines; for, while the mullet has a fleshy stomach like a bird, others have no stomachic dilatation. Pyloric cæca are close to the stomach, and vary in number; there are even some, like the majority of the cartilaginous fishes, which have none whatever. Two bodies are situated along the spine, which have the function of testicles; they open toward the vent, and are much enlarged in the spawning season. The scales become harder with age. Not being provided with lungs, fishes have no voice, but several can emit grunting sounds. They sleep like other animals. In most cases the females exceed the males in size; and in the rays and sharks the male is distinguished by an appendage on each side of the vent."

Aristotle's information on the habits of fishes, their migrations, mode and time of propagation, and economic uses, is, so far as it has been tested, surprisingly correct. Unfortunately, we too often lack the means of recognizing the species of which he gives a description. His ideas of specific distinction were as vague as those of the fishermen whose nomenclature he adopted; it never occurred to him that vernacular names are subject to change, or may be entirely lost in course of time, and the difficulty of identifying his species is further increased by the circumstance that sometimes several popular names are applied by him to the same fish, or different stages of growth are designated by distinct names. The number of fishes known to Aristotle seems to have been about one hundred and fifteen, all of which are inhabitants of the Ægean Sea.

That one man should have discovered so many truths, and laid so sure a basis for future progress in zoölogy, is less surprising than the fact that for about eighteen centuries a science which seemed to offer particular attractions to men gifted with power of observation was no farther advanced. Yet such is the case. Aristotle's disciples, as well as his successors, remained satisfied to be his copiers or commentators, and to collect fabulous stories or vague notions. With very few exceptions (such as Ausonius, who wrote a small poem, in which he describes from his own observations the fishes of the Moselle) authors entirely abstained from original research; and it was not until about the middle of the sixteenth century that ichthyology made a new step in advance by the appearance of Belon, Rondelet, and Salviani, who almost simultaneously published their great works, by which the idea of species was established definitely and for all time.

Without enumerating in detail the many eminent authorities since the time of the three mentioned, we will proceed at once to consider the science in the light of its teachings.

EXTERNAL PARTS.

In the body of a fish four parts are distinguished—the head, trunk, tail, and fins; the boundary between the first and second is generally indicated by the gill-opening, and that between the second and third by the vent. The form of the body and the relative proportions of these principal parts are subject to greater variation than is to be found in any other class of vertebrates. In fishes which are endowed with the power of steady and more or less rapid locomotion, a deviation from that form of body which we observe in a perch, carp, or mackerel is never excessive. The body is a simple, equally-formed wedge, compressed or slightly rounded, well fitted for cleaving the water. In fishes which are in the habit of moving on the bottom, the whole body, or at least the head, is vertically depressed and flattened; and the latter may be so enormously enlarged that the trunk and tail appear merely as an appendage. In one family of fishes, the *Pleuronectidæ* or flat-fishes, the body is compressed into a thin disk; they swim and move on one side only, which remains constantly directed toward the bottom, a peculiarity by which the symmetry of all parts of the body has been affected. In fishes moving comparatively slowly through the water, and able to remain (as it were) suspended in it, a lateral compression of the body, in conjunction with a lengthening of the vertical and a shortening of the longitudinal axis, is found. This deviation from the typical form may proceed so far that the vertical axis greatly exceeds the longitudinal in length; generally all the parts of the body participate in this form, but in one kind of fish (the *Orthagoriscus* or sun-fish) it is chiefly the tail that has been shortened, that being reduced so much as to present the appearance of being cut off. An excessive lengthening of the longitudinal axis, with a shortening of the vertical, occurs in eels and eel-like fishes, and in the so-called band-fishes. They are bottom-fish, capable of insinuating themselves into narrow crevices and holes. The form of the body in these long fishes is either cylindrical (snake-like), as in the eels and many codfishes, or strongly compressed, as in the band-fishes, (*Trichiurus*, *Regalecus*, etc.) It is chiefly the tail that is lengthened, but frequently the head and trunk participate more or less in this form. Every possible variation occurs between these and other principal types of form. The old ichthyologists, even down to Linnæus, depended in great measure on them for classification; but, although the same form of body often obtains in the same groups of fishes, similarity of form by no means indicates natural affinity; it only indicates similarity of habits and mode of life.

The External Parts of the Head.—The eye divides the head into the ante-orbital and post-orbital portions. In most fishes, especially in those with a compressed head, it is situated on the side and in the anterior half of the length of the head; in many others, chiefly those with a depressed head, it is directed upward, and sometimes situated quite at the upper side; in a very few, the eyes look obliquely downward. In the flat fishes both eyes are on the same side of the head, either the right or the left, always on that which is directed toward the light, and colored.

Fishes in general, as compared with other Vertebrata, have large eyes. Sometimes these organs are enormously enlarged, indicating either that the fish is nocturnal in its habits, or lives at a depth to which only a part of the sun's rays penetrate. On the other hand, small eyes occur in fishes inhabiting muddy places, or great depths, to which scarcely any light descends, or in fishes in which the want of an organ of sight is compensated by the development of other organs of sense. In a few fishes, more particularly those inhabiting caves or the greatest depths of the ocean, the eyes have become quite rudimentary and hidden under the skin.

In the ante-orbital portion of the head, or the snout, are situated the mouth and nostrils.

The mouth is formed by the intermaxillary and maxillary bones or the intermaxillary only in the upper jaw, and by the mandibular bone in the lower. These bones are either bare or covered by integument, to which frequently labial folds or lips are added. As regards form, the mouth offers as many variations as the body itself, according to the nature of the food, and the mode of feeding. It may be narrow, or extremely wide and cleft nearly to the hind margin of the head; it may be semi-elliptical, semi-circular, or straight in a transverse line; it may be quite in front of the snout (anterior), on its upper surface (superior), on its lower (inferior), or extending along each side (lateral); sometimes it is subcircular, organized for sucking. The jaws of some fishes are modified into a special weapon of attack (sword-fish, saw-fish); in fact, throughout the whole class of fishes the jaws are the only organ ever specialized for this purpose, weapons on other parts of the body being purely defensive.

Both jaws may be provided with skinny appendages, barbels, which, if developed and movable, are sensitive organs of touch.

In the majority of fishes the nostrils exhibit a double opening on each side of the upper surface of the snout, the openings of each side being more or less close together. They lead into a shallow groove, and only in one family (the Myxinoids) perforate the palate. In this family, as well as in the lampreys, the nasal aperture is single. In many eels the openings are lateral, the lower perforating the upper lip. In the sharks and rays they are at the lower surface of the snout, and more or less confluent. And, finally, in the Dipnoi and other Ganoids, one at least is within the labial boundary of the mouth.

The space across the forehead, between the orbits, is called the interorbital space; that below the orbits, the infraorbital or suborbital region.

In the postorbital part of the head there are distinguished, at least in most Teleosteous fishes and many Ganiods, the præoperculum, a sub-semi-circular bone, generally with a free and often serrated or variously armed margin; the operculum, forming the posterior margin of the gill opening; and the suboperculum and the interoperculum along its inferior margin. All these bones, collectively called opercula, form the gill cover, a thin bony lamella covering the cavity containing the gills.

The gill-opening is a foramen, or slit, behind or below the head, by which the water that has been taken up through the mouth for the purpose of breathing is again expelled. This slit may extend from the upper end of the operculum all round the side of the head to the symphysis of the lower jaw; or it may be shortened and finally reduced to a small opening on any part of the margin of the gill-cover. Sometimes (*Symbranchus*) the two openings, thus reduced, coalesce, and form what externally appears as a single opening only. The margin of the gill-cover is provided with a cutaneous fringe, in order more effectually to close the gill-opening; and this fringe is supported by one or several or many bony rays, the branchiostegals. The space on the chest between the two rami of the lower jaw and between the gill-openings is called the isthmus.

The sharks and rays differ from the Teleosteous and Ganoid fishes in having five branchial slits (six or seven in *Hexanchus* and *Heptanchus*), which are lateral in the sharks, and at the lower surface of the head in the rays. In the *Myxine* only the gill-opening is at a great distance from the head; in that family (*Cyclostomi*) it is either single or there are six or more on each side as in the lampreys.

The Trunk and Tail.—In the trunk are distinguished the back, sides and abdomen. It gradually passes in all fishes into the tail, the termination of the abdominal cavity and the commencement of the tail being generally indicated by the position of the vent. The exceptions are numerous; not only may certain abdominal organs, such as the sexual, extend to between the muscles of the tail, but the intestinal tract itself may pass far backward, or it may even be reflected forward, so that the position of the vent may be either close to the extremity of the tail or to the foremost part of the trunk.

In many fishes the greater part of the tail is surrounded by fins, leaving finless only a small portion between the dorsal, caudal and anal fins; this finless part is called the free portion or the peduncle of the tail.

The Fins.—The fins are divided into vertical or unpaired, and horizontal or paired fins. Any of them may be present or absent; and their position, number, and form are most important guides in determining the affinities of fishes.

The vertical fins are situated in the median dorsal line, from the head to the extremity of the tail, and in the ventral line of the tail. In fishes in which they are least developed or most embryonic, the vertical fin appears as a simple fold of the skin surrounding the extremity of the tail. In its further progress of development in the series of fishes, it gradually extends further forward, and it may reach even the head and the vent. In this embryonic condition the fin is generally supported by fine rays, which are the continuations of, or articulated to, other stronger rays supported by the processes or apophyses of the vertebral column. This form of the vertical fin is very common—for instance in the eels, and many Gadoid, Blennioid, and Ganoid fishes, in which the rays have ceased, besides, to be simple rods, showing more or less numerous joints (simple articulated rays). Branched rays are dichotomously split, the joints increasing in number toward the extremity.

The continuity of the vertical fin, however, is interrupted in the majority of fishes, and three fins are then distinguished: one in the dorsal line—the dorsal fin; one in the ventral line behind the anus—the anal fin; and one confined to the extremity of the tail—the caudal fin.

The caudal fin is rarely symmetrical so that the upper half is equal to the lower; the greatest degree of asymmetry obtains in fishes with a heterocercal termination of the vertebral column. In fishes in which it is nearly symmetrical it is frequently prolonged into an upper and lower lobe, its hind margin being concave or more or less deeply excised; in others the hind margin is rounded, and, when the middle rays greatly exceed in length the outer ones, the fin assumes a pointed form.

Many and systematically important differences are observed in the dorsal fin, which is either spiny-rayed (spinous) (*Acanthopterygian*), or soft-rayed (*Malacopterygian*). In the former, a smaller or greater number of the rays are simple and without transverse joints; they may be flexible, or so much osseous matter is deposited in them that they appear hard and truly spinous; these spines form always the anterior portion of the fin.

which is either detached from, or continuous with, the remaining jointed rays. The spines can be erected or depressed at the will of the fish; if in the depressed position the spines cover one another completely, their points lying in the same line, the fish is called homacanth; but if the spines are asymmetrical, alternately broader on one one side than on the other, the fish is called heteracanth. The spinous division, as well as the one consisting of jointed rays, may again be subdivided. In the Malacopterygian type all the rays remain jointed; indeed, sometimes the foremost ray, with its preceding short supports, is likewise ossified, and is a hard spine, but the articulations can nearly always be distinctly traced. Sometimes the dorsal fin of Malacopterygian fishes is very long, extending from the head to the end of the tail; sometimes it is reduced to a few rays only; and in a few cases it is entirely absent. In addition to the rayed dorsal fin, many Malacopterygian fishes (as the Salmonoids, many Siluroids, Scopeloids, etc.) have another of greater or lesser extent, without any rays; and as fat is always deposited within this fold, it is called a fatty fin (*pinna adiposa*).

The anal fin is built on the same plan as the dorsal; it may be single, or there may be more than one; it may also be long or short, or entirely absent; in Acanthopterygians its foremost rays are frequently simple and spinous.

The horizontal or paired fins consist of two pairs, the pectorals and ventrals.

The pectoral fins (with their osseous supports) are the homologues of the anterior limbs of the higher Vertebrata. They are always inserted immediately behind the gill-opening—either symmetrical, with a rounded posterior margin, or asymmetrical, with the upper rays longest and strongest; in Malacopterygians with a dorsal spine the upper pectoral ray is frequently developed into a similar defensive weapon.

The ventral fins are the homologues of the hind-limbs, and are inserted on the abdominal surface, either behind the pectorals (*Pisces* or *Pinnæ abdominales*) or below them (*Pisces* or *Pinnæ thoracicæ*), or in advance of them (*Pisces* or *Pinnæ jugulares*). They are generally narrow, and composed of a small number of rays, the outer of which is frequently osseous.

For the definition of the smaller systematic groups, and the determination of species, the numbers of the spines and rays are generally of the greatest importance. This holds good especially for the ventral rays, by the number of which the Acanthopterygian affinities of a fish can nearly always be determined. The numbers of the dorsal and anal rays generally correspond to the number of vertebræ in a certain portion of the spinous column, and are therefore constant specific, generic, or even family characters; but when their number is very great, a proportionally wide margin must be allowed for variation, and the taxonomic value of this character becomes uncertain. The numbers of the pectoral and caudal rays are rarely of any account.

The fins are organs of motion, but it is chiefly the tail and the caudal fin by which the fish impels itself forward. To execute energetic locomotion, the tail and caudal fin are strongly bent with rapidity, alternately toward the right and left; while a gentle motion forward is effected by a simple undulating action of the caudal fin, the lobes of which act like the blades of a screw. Retrograde motions can be made by fishes in an imperfect manner only, by forward strokes of the pectoral fins. When the fish wants to turn toward the left, he gives a stroke of the tail toward the right, the right pectoral acting simultaneously, while the left remains pressed close to the body. Thus the pectoral fins assist in the progressive motions of the fish, but rather by directing its course than by acting as powerful propellers. The chief function of the paired fins is to maintain the balance of the fish in the water, which is always most unsteady where there is no weight to sink it; when the pectoral of one side, or the pectoral and ventral of the same side, are removed, the fish loses its balance and falls on the side opposite; when both pectorals are removed, the fish's head sinks; on removal of the dorsal and anal fins the motion of the fish assumes a zigzag course; deprived of all fins, it floats like a dead fish, with the belly upward, the back being the heavier part of the body.

In numerous groups of fishes which live in mud, or are able to pass a longer or shorter time in soil periodically dried and hardened during the hot season, forms occur entirely devoid of, or with only rudimentary, ventral fins (*Cyprinodon*, *Ophiocephalidæ*, *Galaxiidæ*, *Siluridæ*). The chief function of these fins being to balance the body of the fish while swimming, it is evident that in fishes moving during a great part of their life over swampy ground, or through more or less consistent mud, this function of the ventral fins ceases, and nature can readily dispense with these organs altogether.

In certain fishes the shape and function of the fins are considerably modified: thus, in the rays, locomotion is almost entirely effected and regulated by the broad and expanded pectoral fins acting with an undulatory motion of their margins, similar to the undulations of the long vertical fins of the flat-fishes; in many blennies the ventral fins are adapted for walking on the sea-bottom; in some Gobioids (*Periophthalmus*), Trigloids, Scorpænioids and *Pediculati* the pectoral fins are perfect organs of walking; in the gobies, *Cyclopteri* and *Discoboli* the ventral fins are transformed into an adhesive disk; and, finally, in the flying-fish the pectorals act as a parachute. In the eels and other snake-like fishes, the swimming as well as the gliding motions are effected by several curvatures of the body alternately toward the the right and left, resembling the locomotion of snakes. In the *Syngnathi* (pipe-fishes) and *Hippocampi* (sea-horses), whose body admits of but a slight degree of lateral curvature, and whose caudal fin is generally small, if present at all, locomotion is very limited, and almost wholly dependent on the action of the dorsal fin, which consists of a rapid undulating movement.

The Skin and Scales.—The skin of fishes is either covered with scales or naked, or provided with more or less numerous scutes of various forms and sizes. Some parts, like the head and fins, are more frequently naked than scaly. All fishes provided with electric organs, the majority of eels and the lampreys, are naked. Scales of fishes are very different from those of reptiles—the latter being merely folds of the cutis, while the former are distinct horny elements, developed in grooves or pockets of the skin, like hairs, nails, or feathers.

Very small or rudimentary scales are extremely thin, homogeneous in structure, and more or less imbedded in the skin, and do not cover each other. When more developed, they are imbricated (arranged in the manner of tiles), with the posterior part extruded and free, the surface of the anterior portion being usually covered by the skin to a greater or less extent. On their surface may be observed a very fine striation concentric with, and parallel to, the margin, and coarser striæ radiating from a central point toward the hind margin. Scales, without a covering of enamel, with an entire (not denticulated) posterior margin, and with a concentric striation, are called cycloid scales. Ctenoid scales are generally thicker, and provided with spinous teeth on the posterior edges of the layers of which the scale consists. In some species, only the layer nearest to the margin is provided with denticulations. Scales, the free surface of which is spiny, and which have no denticulation on the margin, have been termed sparoid scales; but their distinction from ctenoid scales is by no means sharp, and there are even intermediate forms between the cycloid and ctenoid types. Both kinds of scales may occur, not only in species of the same genus of fishes, but in the same fish.

Ganoid scales are hard and bony, covered with a layer of enamel; they are generally rhombic or quadrangular, rarely rounded and imbricate, and are arranged in oblique rows, those of one row being linked together by an articulatory process. This type of scales, common in fossil Ganoid fishes, occurs among recent fishes in *Lepidosteus* and *Polypterus* only.

Finally, in sharks, the *Balistidæ*, and others, true scales are absent, and are replaced by the ossified papillæ of the cutis, which give the surface the appearance of fine-grained shagreen. These generally small bodies, as well as the large osseous scutes of the rays, sturgeons, etc., have been comprised under the common name placoid scales, a term which is being deservedly abandoned.

Along the side of the body of osseous fishes runs a series of perforated scales, which is called the lateral line. The perforating duct is simple at its base, and may be simple also at its outer opening, or (a frequent case) the portion on the free surface of the scale is ramified. The lateral line runs from the head to the tail, sometimes reaching the caudal fin, sometimes stopping short of it, sometimes advancing over its rays. Some species have several lateral lines, an upper one following the dorsal, a lower the abdominal outline, while a third runs along the middle as usual. The scales of the lateral line are sometimes larger than the others, sometimes smaller; sometimes they are modified into scutes; sometimes there are no other scales besides these, the rest of the body being naked. The foramina of the lateral line are the outlets of a muciferous duct which is continued on to the head, running along the infraorbital bones, and sending off a branch into the præopercular margin and mandible. The muciferous system is abundantly provided with nerves, and has therefore been considered to be the seat of a sense peculiar to fishes, but there can not be any doubt that its function is the excretion of mucus, although probably mucus is execreted also from the entire surface of the fish.

The scales, their structure, number, and arrangement, constitute an important characteristic for the determination of fishes. In most scaly fishes they are arranged in oblique transverse series; and, as the number of scales in the lateral line generally corresponds to the number of transverse series, it is usual to count the scales in that line. To ascertain the number of longitudinal series of scales, the scales are counted in one of the transverse series, generally in that running from the commencement of the dorsal fin, or the middle of the back, to the lateral line, and from the lateral line down to the vent or ventral fin, or the middle of the abdomen.

It is certain that fishes possess the faculty of perceiving odors, and that various scents attract or repel them. A mangled carcase or fresh blood attracts sharks, as well as the voracious Serrasalmonoids of the South American rivers. There is no reason to doubt that the seat of that perception is in the olfactory sac; and it may be reasonably conjectured that its strength depends mainly on the degree of development indicated by the number and extent of the interior folds of the pituitary membrane.

The position, direction and dimensions of the eyes of fishes vary greatly. In some they have an upward aspect, and are often very close together; in others they are lateral, and in a few they are even directed downward. In a very few this organ appears to be entirely absent. In some fishes the eyes, which are on the upper side of the head, can be elevated and depressed at the will of the fish. In the range of their vision and in their acuteness of sight, fishes are very inferior to the higher classes of vertebrates, yet at the same time it is evident that they perceive their prey, or approaching danger, from a considerable distance; and it would appear that the visual powers of a *Periophthalmus*, when hunting insects on the mud-flats of the tropical coasts, are quite equal to those of a frog.

No trace of an organ of hearing has been found in *Branchiostoma*. In the Cyclostomes the labyrinth is inclosed in externally visible cartilaginous capsules laterally attached to the skull; it consists of a single semicircular canal in the Myxinoids, while the *Petromyzontes* possess two semicircular canals with a vestibulum.

In all other fishes the labyrinth consists of a vestibule and three semicircular canals, the vestibule dilating into one or more sacs, which contain the otoliths. A tympanum, tympanic cavity, and external parts are entirely absent in the class of fishes.

Some fishes, especially vegetable feeders, or those provided with broad molar-like teeth, masticate their food; and it may be observed in carps and other Cyprinoid fish that this process of mastication frequently takes some time. But the majority of fishes swallow their food rapidly, and without mastication, and therefore we may conclude that the sense of taste cannot be keen. The tongue is often entirely absent, and, even when it exists in its most distinct state, it consists merely of ligamentous or cellular substance, and is never furnished with muscles capable of producing the movements of extension or retraction as in most of the higher vertebrates. A peculiar organ on the roof of the palate of Cyprinoids is perhaps adapted for the perception of this sense; in these fishes the palate between and below the upper pharyngeal bones is cushioned with a thick, soft, contractile substance, richly supplied with nerves from the nervus vagus and nervus glossopharyngeus.

Organs of Touch.—The faculty of touch is more developed than that of taste, and there are numerous fishes which possess special organs of touch. Most fishes are very sensitive to external touch, although their body may be protected by hard horny scales. They perceive impressions even on those parts which are covered by osseous scutes, in the same manner as a tortoise perceives the slightest touch of its carapace. The seat of the greatest sensitiveness, however, appears to be the snout and the labial folds surrounding the mouth. Many species possess soft and delicate appendages, called barbels, which are almost constantly in action, and clearly used as organs of touch.

Some fishes appear to be much less sensitive than others, or at least lose their sensitiveness under peculiar circumstances. It is well known that a pike whose mouth has been lacerated and torn by the hook continues to yield to the temptation of a bait immediately afterward. The Greenland shark, when feeding on the carcass of a whale, allows itself to be repeatedly stabbed in the head without abandoning its prey. A pair of congers are so dead to external impression at the time of copulation, and, as it were, so automatically engaged, that they have been taken by the hand together out of the water.

ORGANS OF NUTRITION AND DIGESTION.

Fishes are for the most part either exclusively carnivorous or herbivorous, but not a few feed on vegetable as well as animal substances, or on mud containing alimentary matter in a living or decomposing state. Generally they are very voracious, especially the carnivorous kinds, and the rule of "eat or be eaten" applies to them with unusual force. They are almost constantly engaged in the pursuit and capture of their prey, the degree of their power in these respects depending on the dimensions of the mouth and gullet and the strength of the teeth and jaws. If the teeth are sharp and hooked, they are capable of securing the most slender and agile animals; if with teeth of this kind are combined a wide gullet and distensible stomach, the fish is able to overpower and swallow others larger than itself; if the teeth are broad, strong molars, they are able to crush the hardest alimentary substances; if they are feeble, they are only serviceable in procuring some small or inert and unresisting prey. Teeth may be wanting altogether. Whatever the prey, in the majority of cases it is swallowed whole; but some of the most voracious fishes, like some sharks and *Characinidæ*, are provided with cutting teeth, which enable them to tear their prey to pieces if too large to be swallowed whole. Auxiliary organs, similar to the claws of some carnivorous mammals and birds, for the purpose of seizing and overpowering their prey before it is torn by the teeth, are not found in this class; but in a few fishes the jaws themselves are modified for that purpose. In the sword-fishes the bones of the upper jaw form a long dagger-shaped weapon, with which they not only attack large animals, but also frequently kill fishes on which they feed. The saw-fishes are armed with a similar but still more complex weapon, the saw, which is armed on each side with large teeth implanted in deep sockets, specially adapted for killing and tearing the prey before it is seized and masticated by the small teeth within the mouth. Fishes show but little choice in the selection of their food, and some devour their own offspring indiscriminately with other fishes. Their digestive powers are strong and rapid, but are affected in some degree by the temperature, which, when it sinks below a certain point, lowers the vital powers of these cold-blooded animals. On the whole, marine fishes are more voracious than those inhabiting fresh waters; and, while the latter may survive total abstinence from food for weeks or months, the marine species succumb to hunger within a few days.

The organs of nutrition, manducation and deglutition are lodged in two large cavities—an anterior (the mouth or buccal cavity), and a posterior (the abdominal cavity.) In the former the alimentary organs are associated with those fulfilling the respiratory functions, the transmission of food to the stomach and of water to the gills being performed by similar acts of deglutition. The abdominal cavity commences immediately behind the head, so, however, that an extremely short thoracic cavity for the heart is partitioned off in front. Besides the alimentary organs it contains also those of the urogenital system and the air-bladder. The abdominal cavity is generally situated in the trunk only, but in numerous fishes it extends into the tail, being continued for some distance along each side of the hæmal apophyses. In numerous fishes the abdominal cavity opens outward by one or two openings. A single porus abdominalis in front of the vent is found in *Lepidosiren* and some sturgeons; a paired one, opening on each side of the vent, in *Ceratodus*, some species of sturgeon, *Lepidosteus*, *Polypterus*, *Amia*, and all Chondropterygians. As in these fishes semen and ova are discharged by their proper ducts, the abdominal openings may serve for the expulsion of semen, and those of the ova only which, having lost their way to the abdominal aperture of the oviduct, would be retained in the abdominal cavity. In those Teleosteans which lack an oviduct a single porus genitalis opens behind the vent.

Mouth.—The mouth of fishes shows extreme variation with regard to form, size and position. Generally opening in front, it may be turned upward, or it may lie at the lower side of the snout, as in most Chondropterygians, sturgeons and some Teleosteans. In most fishes the jaws are covered by the skin, which, before passing over the jaws, is often folded, forming more or less fleshy lips. In the sharks the skin retains its external character even within the teeth, but in other fishes it changes into a mucous membrane. A tongue may exist as a more or less free and short projection, formed by the glossohyal and a soft covering, or may be entirely absent. Salivary glands and a velum palati are absent in fishes.

Teeth.—With regard to the dentition, the class of fishes offers an amount of variation such as is not found in any of the other classes of vertebrates. As the teeth form one of the most important elements in the classification of fishes, their special arrangement and form will be referred to in the account of the various families and genera. While not a few fishes are entirely edentulous, in others most of the bones of the buccal cavity, or some of them, may be toothed, as the bones of the jaws, the palatines, peterygoids, vomers, basi-sphenoid, glossohyal, branchial arches, upper and lower pharyngeals. In others teeth may be found fixed in some portion of the buccal membrane without being supported by underlying bone or cartilage; or the teeth have been developed in membrane overlying one of the dentigerous bones mentioned, without having become anchylosed to the bone. When the tooth is fixed to the bone the attachment has generally been effected by the ossification of the bone of the tooth, but in some fishes a process of the bone projects into the cavity of the tooth; in others the teeth are implanted in alveoli. In these, again, frequently a process of bone rises from the bottom, on which the tooth rests.

Many of the class, especially predatory fishes, with long, lancet-shaped teeth, have all or some of these capable of being bent toward the interior of the mouth. Such "hinged" teeth resume at once the upright position when pressure is removed from them. They are, however, depressible in one direction only, thus offering no obstacle to the ingress, while they oppose the egress of prey. Mr. C. S. Tomes has shown that the means by which this mechanism is worked are different in different fishes; for, while in the *Pediculati* and Gadoids (hake) the elasticity resides solely in the tissue of the hinge (the tooth being as resilient as ever after everything else is severed), in the pike the hinge is not in the least endowed with elasticity, but the bundles of fibers proceeding from the interior of the dentine cap are exceedingly elastic.

The teeth may be, and generally are, very different as regards size or form in the different parts of the mouth; they may be also different according to the age or sex of the fish (*Raia*). The teeth may be few in number and isolated, or placed in a single, double, or triple series, distant from one another or closely set; they may form narrow or broad bands, or patches of various forms. As regards form, they may be cylindrical or conical; pointed, straight, or curved, with or without an angular bend near their base; some are compressed laterally or from the front backward (the latter may be triangular in shape, or truncated at the top like the incisors of mammals); they may have one apex (cusp) only, or be bi or tri lobate (bi or tri cuspid), or may have the margins denticulated or serrated. Compressed teeth may be confluent, and form a cutting edge in both jaws, which assume the shape of a parrot's beak. In some the apex is hooked or provided with barbs. Again, some teeth are broad, with flat or convex surface, like molar teeth. With regard to size, the finest teeth are like fine flexible bristles, ciliiform or setiform; or, if very short and anchylosed to the bone, they appear only as inconspicuous asperities of the bone. Very fine conical teeth arranged in a band are termed viliform teeth; when they are coarser, or mixed with coarser teeth, they are card-like (dents en râpe or en cardes); molar-like teeth of very small size are termed granular.

In all fishes the teeth are shed and renewed during the whole course of their life.

Intestines.—The intestinal tract is divided into four portions—the œsophagus, the stomach, the small and the large intestine; two or more of these divisions may coalesce in fishes and become indistinguishable. But it is characteristic of the class that the urinary apertures are constantly situated behind the termination of the intestinal tract.

Glands.—The liver of fishes is distinguished by the great quantity of fluid fat (oil) which it contains. The gall-bladder is but rarely absent; it is attached to the right lobe, or toward the center; in some fishes, however, it is detached from the liver and connected with it by the cystic duct only. The bile may be conveyed by one or more hepatic ducts into a common duct which is continued toward the gall-bladder as ductus cysticus, and toward the duodenum as ductus choledochus; or some of the hepatic ducts enter the gall-bladder directly, or the duodenum directly, without communicating with the common duct. Individual variations in this respect are of common occurrence.

The spleen, which is substantially a lymphatic gland, may be mentioned here, as it is constantly situated in the immediate vicinity of the stomach, generally near its cardiac portion. With the exception of *Branchiostoma*, it is found in all fishes, and appears as a rounded or oblong organ of dark red color.

ORGANS OF RESPIRATION.

Fishes breath the air dissolved in water by means of gills or branchiæ. The oxygen consumed by them is not that which forms the chemical constituent of the water, but that contained in the air which is dissolved in the water. Hence fishes transferred to water from which the air has been driven out by a high temperature, or in which the air absorbed by them is not replaced, are speedily suffocated. The absorption of oxygen by fishes is comparatively small; it has been calculated that a man consumes 50,000 times more than is required by a tench. Some fishes, however, evidently require a much larger supply of oxygen than others: eels and carps, and other fishes of similar low vitality, can survive removal from their element for days, the small quantity of moisture retained in their gill-cavity being sufficient to sustain life, while other fishes, especially such as have very wide gill-openings, are immediately suffocated after being taken out of the water. In some fishes noted for their muscular activity, like the *Scombridæ*, the respiratory process is so energetic as to raise the temperature of their blood far beyond that of the medium in which they live. A few fishes, especially such as are periodically compelled to live in water thickened into mud by desiccation and vitiated by decomposing substances, breath atmospheric air, and generally have special contrivances for this purpose. These are so much habituated to breathing air that many of them, even when brought into pure water of normal condition, are obliged to rise to the surface at frequent intervals to take in a quantity of air, and, if they are kept beneath the surface by means of a gauze net, they perish from suffocation. The special contrivances consist of additional respiratory organs, lodged in cavities either adjoining the gill-cavity or communicating with the ventral side of the œsophagus, or of the air-bladder which enters upon respiratory functions.

The water used by fishes for respiration is received by the mouth, driven to the gills by an action similar to that of swallowing, and expelled by the gill openings, of which there may be one or several on each side behind the head, or rarely one only in the median line of the ventral surface.

Air-bladder.—The air-bladder, one of the most characteristic organs of fishes, is a hollow sac, formed of several tunics, containing gas, situated in the abdominal cavity, but outside the peritoneal sac, entirely closed or communicating by a duct with the intestinal tract. Being compressible, its special functions consist in altering the specific gravity of the fish or in changing the center of gravity. In a few fishes it assumes the function of the organ of higher vertebrates of which it is the homologue—viz., of a lung. The gas contained in the air-bladder is secreted from its inner surface. In most fresh-water fishes it consists of nitrogen, with a very small quantity of oxygen and a trace of carbonic acid; in sea fishes, especially those living at some depth, oxygen predominates, as much as 87 per cent. having been found.

Fishes, in common with the other vertebrates, are provided with a complete circulation for the body, with another equally complete for the organs of respiration, and with a particular abdominal circulation, terminating at the liver by means of the vena portæ; but the peculiar characteristic consists in this, that the branchial circulation alone is provided at its base with a muscular apparatus or heart, corresponding to the right half of the heart of mammalia and birds.

The heart is situated between the branchial and abdominal cavities, between the two halves of the scapulary arch—rarely farther behind, as in *Symbranchidæ*. It is enclosed in a pericardium, generally separated entirely from the abdominal cavity by a diaphragma, which is, in fact, the anterior portion of the peritoneum, strengthened by aponeurotic fibers. In some fishes, however, there is a communication between the pericardial and peritoneal sacs, viz., in Chondropterygians and *Acipenser*, while in the Myxinoids the pericardial sac is merely a continuation of the peritoneum.

Relatively to the size of the body, the heart is very small.

ORGANS OF REPRODUCTION.

All fishes are diœcious, or of distinct sex. The majority of fishes are oviparous (comparatively few viviparous), the embryos being developed either in the ovarium or in some dilated portion of the oviduct. In viviparous fishes actual copulation takes place, and the males of most of them are provided with copulatory or intromittent organs. In oviparous fishes the generative products are, during sexual excitement, discharged into the water, a very small quantity of semen being sufficient for effectual impregnation of a number of ova dispersed in a considerable quantity of water—circumstances which render artificial impregnation more practicable than in any other class of animals.

Instances of the female taking care of her progeny are extremely rare in fishes. At present only two examples are known, that of the Siluroid genus *Aspredo*, and the *Solenostoma*.

DOMESTICATION, TENACITY OF LIFE, HIBERNATION, ETC.

Only a few fishes are thoroughly domesticated—that is, bred in captivity, and capable of transportation within certain climatic limits—viz., the carp, crucian carp (European and Chinese varieties), tench, orfe or ide, and goramy. The first two have accompanied civilized man almost to every part of the globe where he has effected a permanent settlement.

Attempts to acclimatize particularly useful species in countries in which they are not indigenous have been made from time to time, but have been permanently successful in a few instances only, the failures being due partly to the choice of a species which did not yield the profitable return expected, partly to utter disregard of the difference of climatic and other physical conditions between the original and the new homes of the fish. The first successful attempts at acclimatization were made with domestic species, viz., the carp and goldfish, which were transferred from Eastern Asia to Europe. Then, in the early part of the present century, the Javanese goramy was acclimatized in Mauritius and Guiana, but no care seems to have been taken to insure permanent advantages from the successful execution of the experiment. In these cases fully developed individuals were transported to the country in which they were to be acclimatized. The most successful attempt of recent years is the acclimatization of the trout and sea-trout, and probably also of the salmon, in Tasmania and New Zealand, and of the Californian salmon in Victoria, by means of artificially-impregnated ova. In transporting these ice was employed, in order to retard their development generally, and thus to preserve them from destruction during the passage across the tropical zone.

Artificial impregnation of fish-ova was first practiced by J. L. Jacobi, a native of Westphalia, in the years 1757–63, who employed exactly the same method which is followed now; and there is no doubt that this able observer of nature conceived and carried out his idea with the distinct object of advantageously restocking water-courses that had become unproductive, and increasing production by fecundating and preserving all ova which, in the ordinary course of propagation, would be left unfecundated or might accidentally perish. Physiology soon turned to account Jacobi's discovery, and artificial impregnation has proved to be one of the greatest helps to the student of embryology.

Fishes differ in an extraordinary degree with regard to tenacity of life. Some will bear suspension of respiration—caused by removal from water, or by exposure to cold or heat—for a long time, while others succumb at once. Nearly all marine fishes are very sensitive to changes in the temperature of the water, and will not bear transportation from one climate to another. This seems to be much less the case with some freshwater fishes of the temperate zones; the carp may survive after being frozen in a solid block of ice, and will thrive in the warmest parts of the temperate zones. On the other hand, some fresh-water fishes are so sensitive to a change in the water that they perish when transplanted from their native river into another apparently offering the same physical conditions. Some marine fishes may be transferred at once from salt into fresh water, like sticklebacks, some blennies, and *Cottus*, etc.; others survive the change when gradually effected, as many migratory fishes; while others, again, cannot bear the least alteration in the composition of the salt water (all pelegic fishes). On the whole, instances of marine fishes voluntarily entering brackish or fresh water are very numerous, while fresh-water fishes proper but rarely descend into salt water.

Abstinence from food affects different fishes in a similarly different degree. Marine fishes are less able to endure hunger than fresh-water fishes—at least in the temperate zones, no observations having been made in this respect on tropical fishes. Goldfishes, carps and eels are known to be able to subsist without food for months, without showing a visible decrease in bulk; while the Trigloids, Sparoids and other marine fishes survive abstinence from food for a few days only. In fresh-water fishes the temperature of the water has great influence on their vital functions generally, and consequently on their appetite. Many cease to feed altogether in the course of the winter; a few, like the pike, are less inclined to feed during the heat of the summer than when the temperature is lowered.

Captivity is easily borne by most fishes, and the appliances introduced in modern aquaria have rendered it possible to keep in confinement fishes which formerly were considered to be intolerant of captivity, and even to induce them to propagate.

Wounds affect fishes generally much less than higher vertebrates. A Greenland shark continues to feed though its head is pierced by a harpoon or by the knife, so long as the nervous center is not touched; a pike will survive the loss of its tail, or a sea-perch that of a portion of it, and a carp that of half its snout. Some fishes, however, are much more sensitive, and perish even from the superficial abrasion caused by the meshes of the net during capture (*Mullus*).

The power of reproduction of lost parts in Teleosteous fishes is limited to the delicate terminations of their fin-rays and the various tegumentary filaments with which some are provided. These filaments are sometimes developed in an extraordinary degree, imitating the waving fronds of the seaweed in which the fish hides. The ends of the fin-rays and also the filaments are frequently lost, not only by accident, but also merely by wear and tear; and, as these organs are essential for the preservation of the fish, their reproduction is necessary. In *Dipnoi*, *Ceratodus*, and *Protopterus*, the terminal portion of the tail has been found to have been reproduced, but without the notochord.

Hibernation has been observed in many Cyprinoids and Murænoids of the temperate zones. They do not fall into a condition of complete torpidity, as reptiles and mammals do, but their vital functions are simply lowered, and they hide in sheltered holes, and cease to go abroad in search of their food. Between the tropics a great number of fishes are known to survive long-continued droughts by passing the dry season in a perfectly torpid state, imbedded in the hardened mud.

The principal benefit derived by man from the class of fishes consists in the abundance of wholesome and nourishing food which they yield. In the polar regions especially, whole tribes are entirely dependent on this class for subsistence; and in almost all nations fishes form a more or less essential part of food, many, in a preserved condition, being most important articles of trade. Their use in other respects is of but secondary importance. Codliver oil is prepared from the liver of some of the Gadoids of the northern hemisphere and of sharks, isinglass from the swim-bladder of sturgeons, Sciænoids, and Polynemoids, and shagreen from the skin of sharks and rays.

The flesh of some fishes is constantly or occasionally poisonous. When eaten, it causes symptoms of more or less intense irritation in the stomach and intestines, inflammation of the mucous membranes, and not rarely death. Poey enumerates no less than seventy-two different kinds from Cuba; and various species of *Sphyræna*, *Balietes*, *Ostracion*, *Caranx*, *Lachnolæmus*, *Tetragonurus*, *Thynnus*, have been found to be poisonous in all seas between the tropics. All or nearly all these fishes acquire their poisonous properties from their food, which consists of poisonous *Medusæ* in all seas between the tropics. All or nearly all these fishes acquire their poisonous properties from their food, which consists of poisonous *Medusæ* and corals, or of decomposing substances. Frequently the fishes are found to be eatable if the head and intestines are removed immediately after capture. In the West Indies it has been ascertained that all the fishes living and feeding on certain coral banks are poisonous. In other fishes the poisonous properties are developed at certain seasons of the year only, especially the season of propagation; as the barbel, pike, and burbot, whose roe causes violent diarrhœa when eaten during the season of spawning.

GEOGRAPHICAL DISTRIBUTION.

In an account of the geographical distribution of fishes the fresh water forms are to be kept separate from the marine. When we attempt, however, to draw a line between these two kinds of fishes, we meet with a great number of species and of facts which would seem to render that distinction very vague. There are not only species which can gradually accommodate themselves to a sojourn in either salt or fresh water, but there are also some that seem to be quite indifferent to a rapid change from the one into the other; so that individuals of one and the same species may be found some distance out at sea, while others live in rivers far beyond the influence of the tide, or even in inland fresh waters without outlet to the sea. The majority of these fishes belong to forms of brackish-water fauna; and, as they are not an insignificant portion of the fauna of almost every coast, we shall have to treat of them in a separate chapter.

Almost every large river offers instances of truly marine fishes ascending for hundreds of miles of their course, and not periodically, or from any apparent physiological necessity, but sporadically throughout the year. This is evidently the commencement of a change in a fish's habits; and, indeed, not a few of such fishes have actually taken up their permanent residence in fresh waters.

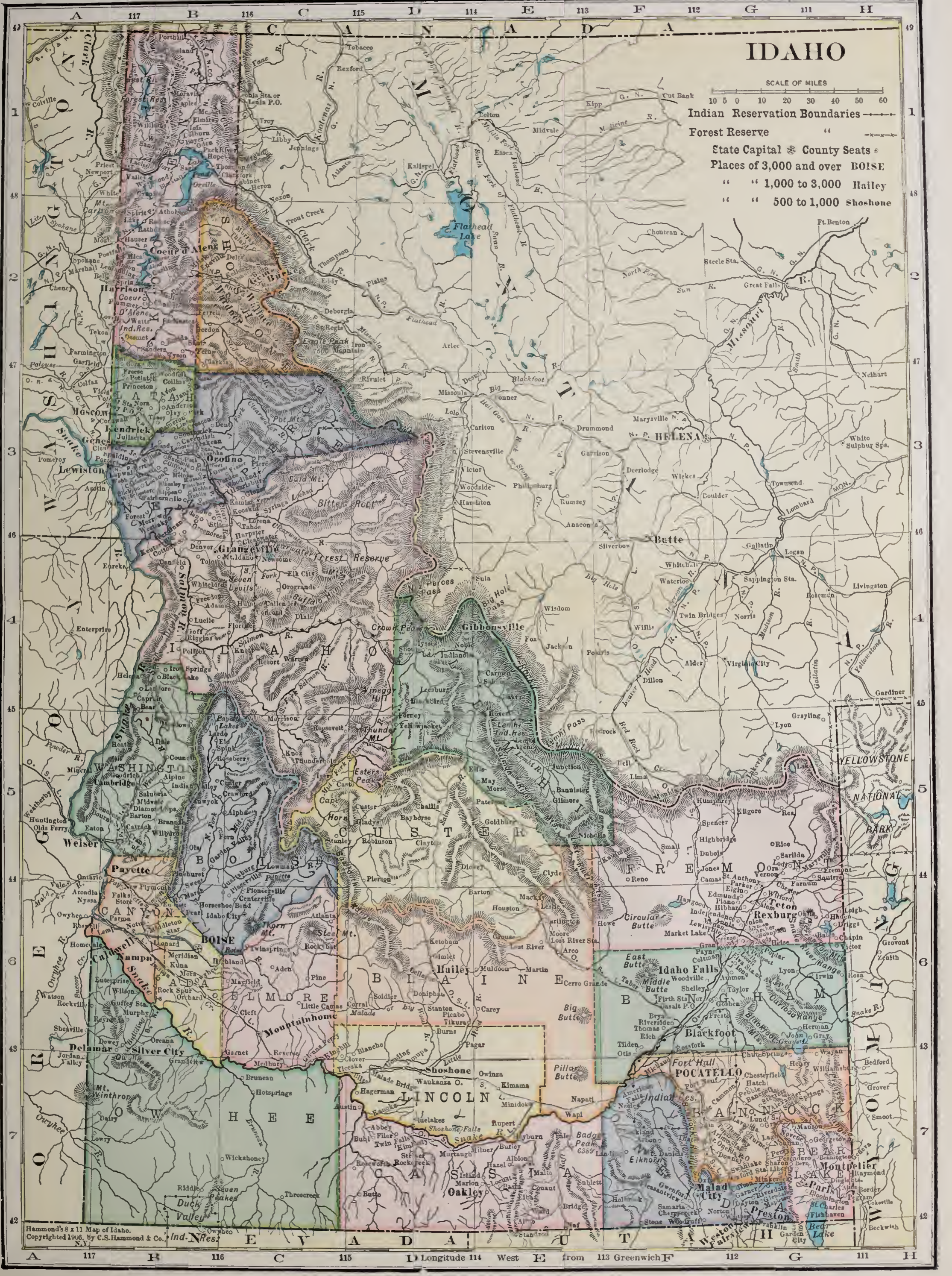
On the other hand, we find fishes belonging to fresh-water genera descending rivers and sojourning in the sea for a more or less limited period; but these instances are much less in number than those in which the reverse obtains.

Some fishes annually or periodically ascend rivers for the purpose of spawning, passing the rest of the year in the sea, as sturgeons, many Salmonoids, some Clupeoids, lampreys, etc. The first two evidently belonged originally to the fresh-water series, and it was only in the course of their existence that they acquired the habit of descending to the sea, perhaps because their fresh-water home did not furnish a sufficient supply of food. These migrations of fresh-water fishes have been compared with the migrations of birds; but they are much more limited in extent, and do not, as is the case with birds, impart an additional element to the fauna of the place to which the fishes migrate.

The distinction between fresh-water and marine fishes is further obscured by geological changes, in consequence of which the salt water is gradually being changed into fresh, or *vice versa*. These changes are so gradual, and spread over so long a time, that many of the fishes inhabiting such localities accommodate themselves to the new conditions. One of the most remarkable and best studied instances of such an alteration is the Baltic, which, during the second half of the Glacial period, was in open and wide communication with the Arctic Ocean, and evidently had the same marine fauna as the White Sea. Since then, by the rising of the land of Northern Scandinavia and Finland, this great gulf of the Arctic Ocean has become an inland sea, with a narrow outlet into the North Sea, and, in consequence of the excess of fresh water pouring into it over the loss by evaporation, it has been so much diluted as to be nearly fresh at its northern extremities; and yet nine species, the origin of which from the Arctic Ocean can be proved, have survived the changes, propagating their species, and agreeing with their brethren in the Arctic Ocean in every point, but remaining comparatively smaller. On the other hand, fishes which we must regard as true fresh-water fishes, like the rudd, roach, pike, perch, enter freely the brackish water of the Baltic. Instances of marine fishes being permanently retained in fresh water in consequence of geological changes are well known; as *Cottus quadricornis* in the large lakes of Scandinavia; species of *Gobius*, *Blennius*, and *Atherina* in the lakes of northern Italy; *Comephorus*, which seems to be a dwarfed Gadoid, in the depths of Lake Baikal. *Carcharias gangeticus* in inland lakes of the Fiji Islands, is another instance of a marine fish which has permanently established itself in fresh water.

ICHTHYOSAURUS (ἰχθύς, fish, σαῦρος, lizard), a genus of extinct reptiles, the species which are the only known representatives of the order *Ichthyopterygia*. Upward of thirty of these have been described, all of Mesozoic age, the genus so far as is certainly known appearing for the first time in the Liassic formation where it most abounds, continuing throughout the Oolitic, and disappearing before the close of the Cretaceous period. Remains of true ichthyosaurs have not yet been found on the American continent, although Professor Marsh lately (1877) described portions of the skeleton of a saurian obtained from strata of Jurassic age in the Rocky Mountains which seems to have differed from Old World ichthyosaurs chiefly in the absence of teeth, the jaws being "entirely edentulous and destitute even of a dentary groove."

Owing to the comparative abundance and excellent preservation of ichthyosaurian remains, the hard parts of those creatures have been studied under exceptionally favorable circumstances, and much has thus been learnt of their structure, and, by inference therefrom, of their life history. They were large marine reptiles, measuring in some instances thirty feet in length, and somewhat resembling in appearance the dolphins of the present day. Like these they were air-breathers, and must therefore have come to the surface to breathe, although being cold-blooded they were no doubt able, like the aquatic saurians of our own period, to remain much longer under water than the warm-blooded *Cetacea*. The ichthyosaurian head was large, and was prolonged into a more or less elongated snout, certain species rivaling in this respect the gavial of the Ganges. The brain cavity, on the other hand, was remarkably small. The eyes were enormously large; the orbit in *Ichthyosaurus platyodon*—the largest known species—having been found to measure fourteen inches in long diameter. This huge eyeball was protected by a ring of bony sclerotic plates similar to those found in rapacious birds and in turtles and lizards of the present day. The jaws, which in *Ichthyosaurus platyodon* have been known to measure six feet in length, were rendered still more formidable by their array of strong, conical, pointed teeth, numbering in some instances over 180, and placed not in distinct sockets, as in the crocodile, but in a common alveolar groove. These, as they became worn, were replaced by a succession of young teeth, which budded up, at the base of the old. The neck in the ichthyosaurus was extremely short, and not marked by any constriction. The vertebræ resembled those of fishes in being deeply biconcave. The tail was long and tapering; in many specimens this organ has been found to be fractured at about a fourth of its length from the extremity, and, as the vertebræ of the same region seem to have been flattened vertically, Professor Owen regards it as probable that these reptiles



Hammond's 8 x 11 Map of Idaho.

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were provided with a tegumentary caudal fin like that of the *Cetacea*, only vertical instead of horizontal; the sole evidence of the presence of such a horizontal fin in extinct whales would be the horizontally flattened condition of the last caudal vertebræ, should any of these chance to be preserved. Ichthyosaurians were provided with two pairs of limbs in the form of paddles, which externally must have borne considerable resemblance to the anterior limbs of dolphins and other *Cetacea*. They differed, however, very markedly from these in the possession of a bony apparatus, stretching, in the case of the front pair, from one shoulder joint to the other, on which the anterior paddles were supported. The hind limbs were in almost all the species much smaller than the pair in front. The skeleton of each of the paddles consisted mainly of a large number—in some species exceeding 100—of small polygonal bones arranged in more than five closely packed longitudinal rows, the whole covered with skin, and forming a highly elastic organ of locomotion. The ichthyosaur was provided with slender ribs along the vertebral column from the anterior part of the neck to the tail; a sternum, however, was wanting, the abdominal walls being strengthened by the development of transverse arcuated bones. As no trace of horny scales or bony scutes has ever been detected in connection with those reptilian remains, it may be assumed that these sea-saurians, as they have been called, were, like the *Cetacea* of the present day, covered with a smooth or wrinkled skin unprovided with any of those dermal appendages.

From a study of their bony structure it may be inferred that these huge aquatic reptiles inhabited the open sea, occasionally visiting the shores, where their powerful paddles enabled them to crawl on land, and where, like seals, they probably loved to bask in the sunshine. That they were predatory in their habits—the tyrants indeed of Mesozoic seas—might be inferred from our knowledge of their jaws and teeth; and this is amply confirmed by an examination of the half-digested contents of their stomachs. Their food seems to have consisted chiefly of ganoid fishes and the smaller reptiles, and as the vertebræ and other remains of young ichthyosaurs have occasionally been found mixed with these, there is reason to believe that they, like many other marine animals, did not hesitate to devour the weaker members of their own species.

ICONIUM (Greek, Ἰκόνιον), an ancient city of Asia Minor, now, under the name of Cogni, Konieh, Koniyeh, Konijah, or Konia, the capital of the Turkish vilayet of Caramania, is situated 310 miles east from Smyrna, at the entrance to an extensive and elevated plain which forms the center of Asia Minor. The number of dwelling-houses is about 7,000, of which 150 are Armenian; and the population numbers in all probability between 40,000 and 50,000.

ICONOCLASTS. See IMAGE WORSHIP.

ICTERUS, a bird so called by classical authors, and supposed by Pliny to be the same as the *Galgulus*, which nearly all writers agree in considering to be what we now know as the Golden Oriole (*Oriolus galbula*). The typical species of *Icterus* is the *Oriolus icterus* of Linnæus, the *Icterus vulgaris* of Daudin and modern ornithologists, an inhabitant of Northern Brazil, Guiana, Venezuela, occasionally it is said visiting some of the Antilles and the United States, but without much apparent proof. They are nearly all gregarious birds, many of them with loud and in most cases, where they have been observed, with melodious notes, rendering them favorites in captivity, for they readily learn to whistle simple tunes, which are admirably reproduced by their clear voice. Some have a plumage wholly black, others are richly clad, as is the well-known Baltimore Oriole, Golden Robin, or Hangnest of the United States, *Icterus baltimore*, whose brightly contrasted black and orange have conferred upon it the name it most commonly bears in North America, those colors being, says Catesby, the tinctures of the armoral bearings of the Calverts, Lords Baltimore, the original grantees of Maryland, but probably more correctly those of their liveries. The most divergent form of *Icteridæ* seems to be that known in the United States as the Meadow Lark, *Sturnella magna* or *S. ludoviciana*, a bird which in aspect and habits has considerable resemblance to the larks of the Old World.

IDAHO, a northwestern State of the United States, was originally a part of Oregon, from which it was separated in 1863. It lies on the Pacific slope, with the exception of a small portion in its southeastern corner, which is drained into the Great Salt Lake of Utah. It is bounded on the north by British Columbia and northeast by Montana; on the east by Wyoming; on the south by Utah and Nevada; and on the west by Oregon and Washington. The area of the State may be set down approximately at 84,800 square miles. The mean elevation is about 4,700 feet. The lowest point, which is on Snake river, at the mouth of the Clearwater, is about 1,000 feet above the sea, while the highest mountains rise nearly to 10,000 feet. The surface is very diversified; the northern portion is largely mountainous, with several fine broad valleys. In the southern portion a large area within the great bend of the Snake river is occupied by an immense plain of basalt. South of the Snake the country is an alternation of broad valleys and narrow abrupt mountain ranges.

The principal mountains are the Bitterroot and Salmon River chains, with their spurs and subordinate ranges. They attain a height of from 8,000 to nearly 10,000 feet. The Snake River plain lies south of these mountains, extending east and west nearly across the territory. This is a field of basalt, seamed and creviced, with little vegetation, and that consisting principally of *Artemisia*. The soil here is a shifting sand; and there is little surface water, as the streams sink and flow underneath.

The principal river is the Snake, the south fork of the Columbia. It is a rapid stream, with numerous falls, three of which, the American, Shoshone, and Salmon or Fishing, are very considerable. It is navigable only in its lower course. Several of the branches of the Snake, the Salmon, Clearwater, and Spokane, are large streams, but are not navigable, and are of value only for irrigation and mining purposes.

The climate, like that of other portions of the northwestern United States, is characterized by great aridity of atmosphere and slight rainfall. In the south the aridity is such that large areas are almost desert; but in the mountainous regions of the north the rainfall is much greater, and agricultural operations can be carried on to some extent without irrigation. The northern part, being principally mountainous, is covered with forests of conifers, chiefly species of pine, spruce, fir, and tamarack. In the open valleys the vegetation consists mainly of the various kinds of grasses known collectively as "bunch-grass." On the Snake River plains there is little vegetable growth except *Artemisia*, while the country south and east of the Snake is covered with this and with grasses, with a little scattered timber (*Coniferæ* and aspens) on the mountains. A rough estimate gives as the area covered by forest 40,000 square miles, by useful grasses 23,000 square miles, and by *Artemisia* 21,300 square miles.

Though the bison formerly ranged over this whole region, it is now practically extinct. The moose is still occasionally seen, and rarely the Rocky Mountain goat (*Aploceras montanus*). The wapiti, the mountain sheep (*Ovis montana*), and various species of deer are still abundant in the mountains, while the antelope or pronghorn abounds in the plains. Grizzly, black, and cinnamon bears, the American panther, the wild cat and the wolverine are not infrequently met with in the less-settled regions and among the forests. Of the smaller quadrupeds the prairie dog and the gopher abound in the valleys and on the plains. Birds of many species are plentiful, especially in the mountain regions. Of reptiles, several species of rattlesnakes, lizards, and horned toads are characteristic of the arid plains, where they are unpleasantly numerous.

The southern portion of Idaho has been the scene of comparatively recent volcanic action, which has covered enormous areas with basalt. The mountains of this division are mainly of the Silurian and Carboniferous ages. The ranges of the northern portion are known to be mainly Eozoic, but much remains to be done in the investigation of the geology of this section.

Idaho is represented in the Congress of the United States by two Senators and one Representative. Provision was made in the organic law for the election of a Governor and other State officers, and a representative body of two houses, similar, in most respects, to the system prevailing in the older States. An attempt to extend the suffrage to women was made, but failed to be adopted. It was provided, however, that women resident six months in the State might hold school offices and vote at school elections. Taxes for State purposes can never exceed one cent on the dollar; when the assessed valuation reaches $50,000,000 the tax may not exceed five mills, and when it reaches $100,000,000 the tax must be reduced to three mills on the dollar. There is a provision for a Board of Immigration, Statistics, and Labor, and eight hours is declared to be a lawful day's work, while the employment of children under fourteen years of age in underground mines is prohibited.

The principal cities are Boisé, the capital, Pocatello, Lewiston, Moscow, and Wallace. The population of the State at the U. S. census of 1900 was 161,772. Pop. (1900) of the capital, 5,957.

The valuation of real and personal property in 1900 was $46,748,414. Agricultural lands cover 16,000,000 acres, forest lands 10,000,000, and grazing and mineral lands 20,000,000. About 8,500,000 acres have been surveyed. There were 1,332 miles of railroad and 2,000 miles of telegraph in 1900. The value of products marketed in that year was $9,520,176.

Mining is the principal industry of Idaho. The chief minerals are gold, silver, lead, and copper, and their total value in 1900 is officially returned at $13,623,428, not quite that of the preceding year. The yield of gold and silver in the State up to June 30, 1901, reached a total of $43,675,245.

Idaho is rich in timber, the most valuable being black, white, and yellow pine, cedar, spruce, birch, and tamarack.

The people of Idaho being anxious to attain statehood, called a convention, which met at Boisé City, July 4, 1889, and framed a State constitution. They claimed to possess the necessary population and other qualifications for admission to the Union, and incorporated in their proposed organic act a special provision against polygamy, this being directed at the Mormons, who have in the last few years settled in the Territory. The action of the convention was ratified by the people, and in July, 1890, Idaho was admitted into the sisterhood of States, being the forty-fourth to join the Union.

The total number of Indians in Idaho is about 6,000, consisting of the tribes known as the Nez Percé, Bannack, Shoshone, Cœur d'Alène, Spokane, Pend'Oreille, and Kootenai. They are under the control of the government, and most are settled on reservations.

IDIOCY. See INSANITY.

IDLE, a town of the West Riding of Yorkshire, in the parish of Calverley, is pleasantly situated on an eminence near the river Aire, on the Great Northern Railway, nine miles northwest of Leeds and three north of Bradford. Population about 13,600.

IDOLATRY. The word εἰδωλολατρεία (*idololatria*, afterward shortened occasionally to εἰδολατρεία, *idolatria*), occurs in all four times in the New Testament, viz., in I Cor. x. 14, Gal. v. 20, I Pet. iv. 3, Col. iii. 5. In the last of these passages it is used, obviously in a typical sense, to describe the sin of covetousness or "mammon-worship." In the other places it is employed in its natural sense, but with the utmost generality, to indicate all the rites and practices of those special forms of Paganism with which Christianity first came into collision. It can only be understood by reference to the LXX., where εἴδωλον, *eidolon* (like the word "idol" in A. V.) occasionally translates indifferently no fewer than sixteen words by which in the Old Testament the objects of what the later Jews called "strange worship" זָרָה עֲבוֹדָה are denoted. In the widest acceptation of the word, idolatry in any form is absolutely forbidden in the second commandment, which runs "Thou shalt not make unto thee a graven image; [and] to no visible shape in heaven above, or in the earth beneath, or in the water under the earth, shalt thou bow down or render service." For some account of the various interesting questions connected with the many practical departures from this law which are recorded in the history of the Israelites the reader is referred to the article JEWS; those differences as to the interpretation of the prohibition which have so seriously divided Christendom are discussed under the head of IMAGE WORSHIP.

Most religions of which the history has been traced give distinct indications of a primitive period in which "idols" were unknown. In the Vedic hymns it is the appearances of nature themselves that are worshiped as symbols of unseen deity; and the present image worship of the Hindus is most probably Post-Buddhistic in its origin. The testimonies of the Greek historians as to the absence of religious images from the worship of the ancient Persians is confirmed by all the more recent direct investigations into the primitive life of that branch of the Aryan race. There is the same concurrence of testimony as regards the ancient Greeks; the powers of nature were in the first instance worshiped through natural symbols—such as serpents, trees, meteoric stones—and in some cases temples occurred which contained no visible symbol at all. Even in the Homeric poems, the allusions to images of the gods are but few; where an image is mentioned, it is evident that it was of the rudest description, and but little indebted to human art. The same remark applies to the cultus of ancient Rome. It was carried on without the use of images until the comparatively late period at which the state entered into relations with Etruria, Magna Græcia, and Sicily.

The decalogue contains a direct precept against the making of any "graven image," for religious uses at least. The "graven images" contemplated in the passage last cited are images of men, quadrupeds, birds, reptiles, and fishes; and the manner in which the prohibition is made is fitted to suggest that all these "likenesses" had made their appearance and already become objects of religious veneration prior to its promulgation.

Nothing certain, however, is known as to the "strange gods" alluded to in Gen. xxxv. 4 as having been buried by Jacob under the oak at Shechem; nor can much be said with regard to the "teraphim" which are first mentioned as having been worshiped in one of the branches of the family of Terah, but are often subsequently referred to as having been used in the time of the judges, and at various stages throughout the history both of the northern and of the southern kingdom. Sometimes they must have been but small; but from other passages it may be inferred that they may have been, occasionally at least, of human form and size. Much obscurity attaches also to the calf worship of which an instance occurred in the wilderness, and which was a prominent feature in the religion of the northern kingdom from the days of Jeroboam to the end; it is a disputed question whether the cult was of Egyptian or of purely Semitic origin; if so, these passages contain no allusion to image worship. The various forms of the Baal cultus so often referred to in the Old Testament were no doubt Semitic; there are no explicit references to any images, however, in this connection; and in point of fact (see BAAL) that deity was generally represented in his "high-places," not by images, but by obelisks or pillars. That the plastic arts, even in a religious connection, were not wholly discouraged among the Jews, appears from what we read, not only about the brazen serpent in the wilderness, but also about the existence in tabernacle and temple of such figures as cherubs executed in various materials, lions, oxen, lotus flowers, and pomegranates. The graphic descriptions of the process of idol-making, both "graven images" and "molten images" in Isa. xl. and xliv. show that the exercise of those arts was far from being confined, at the periods to which these passages relate, within the limits fixed by the second commandment. After the captivity, however, there developed itself among the Jews a steadily growing tendency to interpret the language of the law with the most stringent literality; and at the time of the Roman occupation the masses, under Pharisaic influences, showed a sensitiveness on the subject of images which in certain recorded instances led to very striking results. Thus, the existence of trophies in the theater at Jerusalem was violently objected to; Vitellius found it necessary to avoid Judæa in his march from Antioch to Petra, lest the Holy Land should be defiled by the presence of the Roman eagles; at the outbreak of the Jewish war the house of Antipas at Tiberias was destroyed because it was adorned with sculptures. This aversion to every exercise of the imitative arts, as regards living things at least, passed over from Judaism to Mahometanism.

IDRIA, a mining town in Austria in the duchy of Carniola and circle of Loitsch, situated in a narrow Alpine valley on the river Idrizza, twenty-eight miles north-northeast of Trieste.

IDRISI. See EDRISI.

IDUMEA ('Ιδουμαία) is the Greek form of the Hebrew Edom (אֱדֹם), a district south of the Holy Land. The name Edom is restricted in the Bible to the mountain country southeast of the Dead Sea, and to the chain of Mount Hor near Petra. The word means "red," and the title was no doubt derived from the red color of the cliffs of Nubian sandstone, which form the greater part of this chain. The coast or desert of Edom was bounded by the desert of Zin (the present *'Arabah*) on the west, by the desert of Paran on the southwest, and extended as far as Eziongeber and Eloth, at the head of the Gulf of Akabah. It is identified with Mount Seir, the possession of Esau. In later times, however, we find that the term Idumea receives a considerable extension, embracing all the pastoral country south of Judæa, and extending even within the borders of Philistia.

The aboriginal inhabitants of Idumea were the Horim or "cave dwellers" expelled by Esau.

IFFLAND, AUGUST WILHELM, a German actor and dramatic author, was born in Hanover on April 19, 1759. He died in 1814.

IGLAU, or JIHLAVA, one of the oldest towns of Moravia, and second only to Brünn in respect of size and population, is situated about fifty miles west-northwest of that city, and on the right bank of the Iglawa, close to the Bohemian frontier. Iglau is the capital of a circle of the same name, the seat of the judicial authorities, and the military headquarters of the district. The population amounts to about 20,200, most of whom are Germans or of German extraction.

IGLESIAS, a town of Sardinia, capital of a district in the province of Cagliari, is beautifully situated among limestone hills about three miles from the west coast, and at the terminus of a railway line from Cagliari. thirty-four miles west-northwest from that town.

IGLÓ, formerly NEUDORF, a mining town of North Hungary, in the county of Szepes or Zips, is pleasantly situated on the Hernád, and on the Kaschau-Oderberg line of railway, about five miles south of Löcse (Leutschau).

IGNATIUS, ST. See APOSTOLIC FATHERS.

IGNATIUS DE LOYOLA, ST. See LOYOLA.

IGNORANTINES, as the Brethren of the Christian Schools are commonly though improperly called, are a religious fraternity founded at Rheims in 1679, and formally organized in 1683, by the priest Jean-Baptiste de La Salle, for the purpose of affording a free education, especially in religion, to the children of the poor. The name Ignorantine was given either on account of the low class of the pupils, or from a clause in the rules of the order forbidden its members to learn or teach Latin.

IGUALADA, a town of Spain, in the province of Barcelona, is situated on the left bank of the Noya, in a rich agricultural and vinebearing country, thirty-two miles northwest of Barcelona. Population, 11,900.

IGUANA (*Iguanidæ*), a family of lizards belonging to the suborder *Pachyglossæ* or "thick-tongued," and comprising fifty-six genera and 236 species. With a single undoubted exception, all the genera of this extensive family belong to the New World, being specially characteristic of the Neotropical region, where they occur as far south as Patagonia, while extending northward into the warmer parts of the Nearctic region as far as California and British Columbia. The single non-American genus—*Brachylophus*—occurs in the Fiji Islands. The iguanas are characterized by the peculiar form of their teeth, these being round at the root and blade-like, with serrated edges toward the tip, resembling in this respect the gigantic extinct reptile iguanodon. The typical forms belonging to this family are distinguished by the large dewlap or pouch situated beneath the head and neck, and by the crest, composed of slender elongated scales, which extends in gradually diminishing height from the nape of the neck to the extremity of the tail. The latter organ is very long, slender, and compressed, while its vertebræ, in common with those of certain other lizards, possess thin unossified septa traversing their centers. It is owing to the weakness thus produced in their vertebral column that, when caught by the tail, they are able to part so readily with the portion seized. The tongue is generally short and not deeply divided at its extremity, nor is its base retracted into a sheath; it is always moist and covered with a glutinous secretion. The prevailing color of the iguanas is green; and, as the majority of them are arboreal in their habits, such coloring may be generally regarded as protective. Those on the other hand which reside on the ground have much duller, although as a rule equally protective hues; thus Darwin observed on the shores of Bahia a terrestrial member of this family, which from its mottled appearance could hardly be distinguished from the surrounding surface. Iguanas, however, possess to an extent only exceeded by the chameleon the power of changing their colors, their brilliant green becoming transformed in an instant, under the influence of fear or irritation, into more somber hues and even into black. They differ greatly in size, from a few inches to several feet in length.

IGUANODON, a genus of extinct Dinosaurian reptiles the remains of which have been found in greatest abundance in the Wealden, a delta formation of the southeast of England. Although no complete skeleton of the iguanodon has been found, such bones of it as have been obtained prove it to have been one of the largest terrestrial animals known. Thus its femur in one instance measured from four to five feet in length, with a circumference of twenty-two inches at its narrowest part. These and other measurements led Doctor Mantell—the original discoverer of *Iguanodon*—and others to conclude that it probably attained a length of from fifty to sixty feet. Its front limbs appear to have been small, while the hind pair attained enormous development, and from the structure of the latter, which may be regarded as intermediate between those of existing reptiles and of birds, the iguanodon is supposed to have either habitually or occasionally walked on its hind legs like a bird. This supposition is rendered all the more probable by the discovery in the same strata of gigantic three-toed footsteps in pairs such as might have been formed by the iguanodon had it walked in this bipedal manner. The teeth of these animals formed one of their most marked characteristics—bearing a striking resemblance to the teeth of existing iguanas in their blade-like form and serrated edges, but differing from these as well as from those of all other known reptiles in internal structure. Like existing iguanas they were probably herbivorous, using their teeth for cutting and tearing their tough vegetable food; unlike these, however, they appear to have used their teeth also for the purpose of mastication. This is shown by the deeply worn condition in many cases of the crowns of their teeth, which, from being sharp and incisor-like, gradually assumed a molar-like form. As the old teeth were thus reduced by "tear and wear," they were gradually replaced by a fresh dental crop. The front portion of the jaws was destitute of teeth, the upper part being beak-like, while the lower part was hollowed out like the same region in the parrot. Professor Owen regards this as an arrangement to facilitate the protrusion of what was probably a long prehensile tongue—an organ which the iguanodon may be supposed to have employed in stripping the foliage from the trees. There is no fossil evidence to show that it possessed either scutes, scales, or any other form of dermal armor.

IGUVIUM. See EUGUBINE TABLES and GUBBIO.

ILCHESTER, formerly IVELCHESTER, a market-town of Somersetshire, England, is situated in the valley of the river Ivel or Yeo, thirty-three miles south-southwest of Bath, and five miles north-northeast of Yeovil railway station.

ÎLE-DE-FRANCE, an old district of France forming a kind of island, bounded by the Marne, the Seine, the Oise, the Aisne, and the Ourcq. Until the end of the Carlovingian dynasty it was included in the domains of the crown. It was bounded on the north by Picardy, on the west by Normandy, on the south by Orléannais and Nivernais, and on the east by Champagne. Its capital was Paris.

ILFRACOMBE, a market-town, seaport, and watering-place of Devonshire, is picturesquely situated on the Bristol Channel, and at the terminus of a branch of the London and South-Western Railway, eleven miles north-by-west of Barnstaple, and fifty miles northwest-by-west of Exeter. Population, 8,000.

ILHAVO, a town of Portugal, province of Beira and district of Alveiro, is situated on the Atlantic Ocean, eight miles southwest of Alveiro, and thirty-four north-west of Coimbra. Population about 7,283.

ILI, one of the principal rivers of Central Asia, in what is now the Russian province of Semiryetchensk. The head-stream, called the Tekes (French form, Tekesse), rises at a height of 11,600 feet in the Ulabas mountains, which lie to the east of Lake Issyk-kul. At first it flows eastward and northeastward through a mountainous gorge which gradually widens into a valley of considerable breadth between the Tian-Shan range on the south and the Kara-Tau and the Temur-lik or Nan-Shan on the north. Meeting the Kunges from the east, the river takes a westerly direction; and under the name of Ili it continues to hold westward for about 300 miles, to the neighborhood of the military post of Ili or Ilijsk. At Ilijsk the river turns northwest, and at length, after traversing a district of desert and marsh, it falls by at least seven mouths into the Balkhash Lake, the first bifurcation of the delta taking place about 115 miles up the river.

ILIOS, or ILIUM. See TROAD and TROY.

ILKESTON, a market-town of Derbyshire, England, is situated on a hill commanding fine views of the Erewash valley, and on the Erewash branch line of the Midland Railway, eight miles west by north of Nottingham, and nine northeast of Derby. Pop., 23,500.

ILLE-ET-VILAINE, a maritime department of France, formed out of part of the old province of Brittany, is situated on the northwest coast. It is bounded on the north by the sea and the department of Manche, on the east by Mayenne, on the south by Loire-Inférieure, and on the west by Morbihan and Côtes-du-Nord. Its takes its name from its two principal rivers, the Ille and the Vilaine. The chief town is Rennes, and the principal seaport St. Malo. The department has an area of 2,597 square miles. The population in 1872 was 589,532, and in 1901 it had reached 611,477.

*ILLINOIS, the French form of an Algonquin Indian name meaning "true men" and once borne by a confederation of tribes in the eastern Mississippi valley, is the name of the chief of the "prairie States" of the American Union. It was the eighth new State added to the original thirteen, and is now third in population, and the most populous west of the Allegheny Mountains.

Description.— Illinois lies between the parallels of 37° and 42° 30′ north latitude, and the meridians of 87° 30′ and 91° 30′ longitude west from Greenwich. It is bounded on the north by Wisconsin, on the east by Lake Michigan and Indiana, on the south by Kentucky, from which it is divided by the Ohio River, and on the west by Iowa and Missouri, from which it is divided by the Mississippi River for the whole distance of nearly 700 miles. It extends to the centre of Lake Michigan and of the Mississippi River, but only to the low water mark on the Ohio River. Its area is 56,000 square miles of land and 650 square miles of water. Its surface is more level than that of any other State, with two possible exceptions. There is not a mountain nor even a hill in the State, the highest elevation being less than 825 feet above tidewater and the lowest about 300. There is a gradual and general slope toward the southwest. The Wabash River forms nearly half the boundary between Illinois and Indiana. The chief river within the State is the Illinois, which

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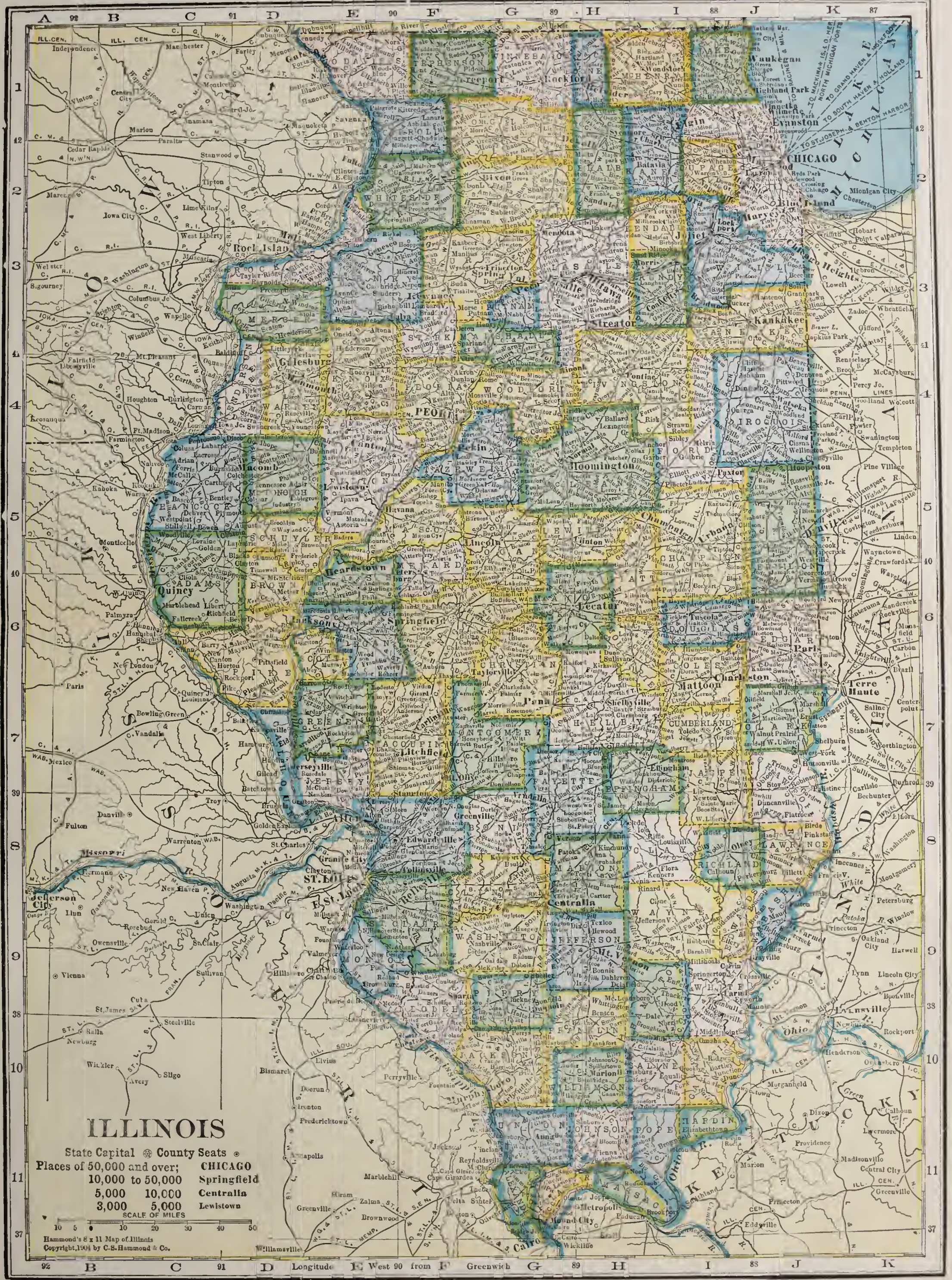

ILLINOIS

State Capital ⊛ County Seats ⊙
Places of 50,000 and over; CHICAGO
10,000 to 50,000 Springfield
5,000 10,000 Centralia
3,000 5,000 Lewistown
SCALE OF MILES
10 5 0 10 20 30 40 50
Longitude West 90 from Greenwich
LAKE MICHIGAN
IOWA
MISSOURI
INDIANA
KENTUCKY

Hammond's 8 x 11 Map of Illinois

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with its tributaries flows across the State from near Lake Michigan at the northeast to the Mississippi at the southwest, and, in connecting with the Chicago river and a canal, forms a navigable waterway from the Lake to the Mississippi. The Rock River in the north and the Little Wabash in the south are the only other streams worth mention, though there are numerous smaller ones affording an ample water supply. There are a few small lakes in the extreme north and south. Geologically, the State is largely underlaid with Permo-Carboniferous rocks. The Silurian formation prevails in the north, and the Tertiary in the west. The climate of Illinois varies much according to latitude. The temperature in winter ranges from 25° to 54°, and in summer from 68° to 80°, Fahrenheit. The rainfall is from 33 to 38 inches.

Resources and Products.— Much of the State is underlaid with bituminous coal, one-fifth of the entire coal area of the United States being found within its borders. After Pennsylvania it is the largest coal-producing State in the Union. Fire clay, kaolin, lead, copper, zinc, limestone, sandstone and salt have also been found in large quantities. The soil is generally very rich and admirably suited to agriculture. Much of the State is still well wooded. The chief industry is agriculture, Illinois in that respect outranking every other State in the Union. The chief crops are corn, wheat, oats, rye, barley, buckwheat, tobacco, potatoes and hay. Vegetables and fruits are abundantly produced, and all kinds of live stock are reared. The number of farms in 1900 was 264,151, containing a total of 5,095,509 acres of improved and 27,699,219 of unimproved land. The value of these farms and their buildings was $1,765,581,550; of the implements and machinery, $44,977,310; and of the live stock, $193,758,037. The total value of farm property was $2,004,316,897, an aggregate many millions larger than that of any other State in the Union.

Industries.— Manufacturing establishments in Illinois in 1900 numbered 38,360, with a capital of $776,829,598. These employed 395,110 wage earners, to whom were paid wages amounting to $191,510,962. The cost of materials used was $739,754,414, and the value of the product was $1,259,730,168.

The internal revenue collected in Illinois in 1902 was $54,029,115, a much larger sum than in any other State, and about one-fifth of that from the whole United States. That is explained by the fact that in that year Illinois produced 39,742,836 gallons of distilled spirits, or more than one-fourth of the total product of the United States.

Illinois is also the chief producer of oleomargarine, the output in 1902 being 49,359,177 pounds, or two-fifths of all made in the United States.

Finance and Commerce.— Eleven national banks in Chicago in 1902 had a total of $186,932,319 loans and discounts, and 265 country banks in the rest of the State had at the same time $95,074,768 more. The savings banks of Illinois in 1902 had 277,879 depositors, and a total of $100,072,804 deposits. The exchanges of the Chicago clearing house in 1902 were $8,341,534,350.

Being an inland State, Illinois has comparatively little direct foreign commerce, such as it has being conducted by way of Lake Michigan. The exports from the customs district of Chicago vary greatly from year to year. In 1890 they were $2,480,852, and in 1901 they were $10,030,209. Imports are much more uniform, but are steadily increasing. In 1902 they were $16,860,702. The principal exports are corn, oats, wheat, pork and lard.

Railroads.— Since 1870 Illinois has enjoyed the distinction of having a greater mileage of railroads within its borders than any other State. The mileage was 2,790 in 1860, 4,823 in 1870, 7,851 in 1880, 10,165 in 1890, and 11,058 in 1900. In the last-named year the total mileage in the United States was 194,333. In 1901 Illinois had 55 street and elevated railroads, of which 1,724 miles were operated by electricity and 110 miles by other forms of traction. These roads used 7,684 cars, and had a capital of $158,791,060.

Education.— The number of children of school age, between five and eighteen years, in Illinois in 1900 was estimated at 1,319,655, of whom 958,911 were enrolled in school. The average attendance was 737,576. The average school year was 152 days. There were 6,950 male and 19,363 female teachers, and the total salary list of superintendents and teachers was $17,757,145. There were 369 public high schools, with 1,592 teachers and 41,176 pupils. There were five public normal schools, with 94 teachers and 2,593 pupils. There were 31 colleges and universities, with 956 instructors, and 11,212 students. The one school of technology had 47 instructors and 566 students. There were fifteen theological seminaries, with 105 instructors and 1,162 students; nine law schools with 149 instructors and 1,086 students; and fourteen colleges of medicine, with 670 instructors and 3,579 students.

Government.— Illinois is divided into 102 counties. The State capital is Springfield, near the geographical centre of the State. The chief State officers are a Governor, Lieutenant Governor, Secretary of State, Auditor, and Attorney-General, elected for four years each; a Treasurer, elected for two years, and a Chief Justice, for one year. There is a Legislature of two houses, elected biennially. The State maintains a fine system of free schools, at which attendance is compulsory, five normal schools, an industrial college, and an agricultural college. There are also ample State hospitals, asylums, homes, etc., for the unfortunate classes.

History.— The history of Illinois dates from the seventeenth century, when that region was entered by the French from Canada and some trading posts and forts were established. In the early part of the eighteenth century a chain of forts was projected and partly built from the Great Lakes to the mouth of the Mississippi River. The chief of these in Illinois was Fort Charles. The most important settlement was at Kaskaskia. Illinois formed part of the Northwest Territory which was in dispute between France and England in the French and Indian War, and in 1763 became a part of British America. The British Government annexed it to the Province of Canada, but Virginia and the other colonies claimed it as their own. Early in the Revolution, therefore, George Rogers Clark organized an expedition for the conquest of it, captured Kaskaskia, and established the title of the United States to it, a title which was confirmed in the Treaty of Paris in 1783. The Virginia Legislature organized a part of it into the county of Illinois, in 1778. At the close of the Revolution the whole region was ceded by the separate States to the United States, and was placed under the control of Congress by the famous Ordinance of 1787 for the government of the Northwest Territory. Illinois was made an organized Territory on February 3, 1809, and by joint resolution of Congress was made a State and a member of the Union on Dec. 3, 1818. During its territorial period it suffered much from Indian depredations, and long after it became a State, in 1832, it was the scene of the Black Hawk War, in which Abraham Lincoln was an officer. The establishment of the Mormons at Nauvoo, and their expulsion, disturbed the tranquillity of the State in 1840–44. The hardy settlers of Illinois furnished six regiments of volunteers during the Mexican War; and in the Civil War, when an adopted son of Illinois, Abraham Lincoln, was President, about 260,000 men, or fifteen per cent. of the entire population of the State, were mustered into the Union army. In later years Illinois has been the scene of some of the greatest strikes and other social disturbances ever known in America, these being contributed to partly by the vast railroad mileage of the State and the volume of its domestic commerce, and partly by the large foreign population massed in Chicago.

Population.— The population of Illinois at decennial periods has been as follows:

Year.	White.	Colored.	Total.
1810	11,501	781	12,282
1820	53,788	1,374	55,162
1830	155,061	2,384	157,445
1840	472,254	3,929	476,183
1850	846,034	5,436	851,470
1860	1,704,323	7,628	1,711,951
1870	2,511,129	28,762	2,539,891
1880	3,031,503	46,368	3,077,871
1890	3,769,323	57,028	3,826,351
1900	4,736,472	85,078	4,821,550

In 1810 and 1820 Illinois ranked twenty-fourth in the Union in population; in 1830, twentieth; in 1840, fourteenth; in 1850, eleventh; in 1860, 1870, and 1880, fourth; and in 1890 and 1900, third. The density of population, or average number of inhabitants to the square mile has been: 1810, 0.2; 1820, 1.0; 1830, 2.8; 1840, 8.5; 1850, 15.2; 1860, 30.6; 1870, 45.4; 1880, 55.0; 1890, 68.3; 1900, 86.1. The native and foreign born populations have been as follows according to the last three decennial censuses:

	1880.	1890.	1900.
Native	2,494,295	2,984,005	3,854,803
Foreign	583,576	842,347	966,747

The cities of Illinois above 25,000 population, with their rank among the cities of the United States and their population at the last three censuses, are as follows: (The rank in parentheses.)

	1880.		1890.		1900.	
Chicago,	(3)	503,185	(2)	1,099,850	(2)	1,698,575
Peoria,	(66)	29,459	(70)	41,024	(67)	56,100
Quincy,	(72)	27,268	(95)	31,494	(108)	36,252
Springfield,	(96)	19,743	(123)	24,963	(116)	34,159
Rockford,	(126)	13,129	(128)	23,584	(130)	31,051
E. St. Louis,	(141)	9,185	(152)	15,169	(136)	29,655
Joliet,	(134)	11,657	(129)	23,264	(137)	29,353

W. FLETCHER JOHNSON.

ILLUMINATI, or "Enlightened," is a title which at different times has been given to, or assumed by, various sects or orders of mystics, on the ground of the superior knowledge of God and of divine things which they claimed. Among these may be mentioned that of the Spanish "Alombrados" or "Alumbrados," which arose about the year 1520, and which before its final disappearance about a century later afforded numerous victims to the Inquisition, especially at Cordova. Ignatius Loyola, while a student at Salamanca (1527), was tried by an ecclesiastical commission for alleged sympathy with its views, but was acquitted with an admonition. Under the name of Illuminés a similar sect appeared in Picardy in 1623, and afterward entered into close relations with the Guérinets or followers of Pierre Guèrin; but by its antinomianism it soon provoked repressive measures, to which it finally succumbed in 1635. The history of another sect of Illuminés, which appeared in the south of France about 1722, is very obscure, but it is said to have subsisted until 1794. The title of Illuminati has often been popularly bestowed also on Rosicrucians, Martinists, and Swedenborgians; but one of the most recent as well as most important applications of this elastic word has been to denote a secret society, or semi-political semi-religious order, which made some stir in Germany, especially in the southern and Catholic portions of it, from 1776 to 1784. It was founded on May 1, 1776, by Adam Weishaupt, professor of canon law at Ingolstadt, and an ex-Jesuit.

ILLUMINATION is a term which has long been used to signify the embellishment of written or printed text or design with colors, and especially with gold, more rarely also with silver. The luster of the former metal may probably have led to the adoption of the word in this sense. The Latin verb *illuminare*, with the meaning of "to decorate," occurs as early as the eighth century; and in the first portion of the *Roman de la Rose*, composed before 1260, *enluminer* is found with a similar meaning, while Dante alludes to this kind of painting and its French designation. In Early English we find the forms *enlomyne*, *luminen*, *limnen*, whence *limn.* Of synonymous use with these terms we find in the Middle Ages the words *miniare* and *miniatura*, from *minium*, a red pigment, in early use for decorating MSS. Miniature employed in connection with the art of illumination now, however, generally signifies a picture or portrait as distinguished from mere ornament or ornate letters.

ILLYRIA is the name applied to the country that lies to the east of the Adriatic Sea. The boundaries of the country thus known varied very much at different periods. For a short time, in the fourth and third centuries B.C., there was some slight government under monarchs whose power was acknowledged by the whole country; but in general the land was either a province of some conquering race or the abode of isolated tribes with little or no common feelings or aims.

At this early period then we may say that the Danube, as the boundary between the northern and the southern family, was the limit of the Illyrian tribes toward the north. The earlier history of the Macedonian kings is one constant struggle against the Illyrian tribes. The migrations of the Gauls at the beginning of the fourth century disturbed the country between the Danube and the Adriatic. The Scordisci and other Gallic tribes settled there, and forced the Illyrians toward the south. The necessities of defense seem to have united the Illyrians under a chief Bardylis (about 383 B.C.) and his son Clitus. Bardylis nearly succeeded in destroying the rising kingdom of Macedonia; King Amyntas was defeated, and a few years later Perdiccas was defeated and slain. But the great Philip crushed them completely, and annexed part of their country. During the next century we hear of them as pirates. Issuing from the secluded harbors of the coast, they ravaged the shores of Italy and Greece, and preyed on the commerce of the Adriatic. The Greeks applied to Rome for help. Hellenism had proved too weak to civilize the northern races; it was left to the stronger organization of Rome to absorb them. Teuta, the Illyrian queen, at first scorned the Roman demands for redress, and even murdered the ambassadors; but the two Illyrian wars (229 and 219 B.C.) ended in the submission of the Illyrians, a considerable part of their frontier being annexed by the conquerors. In 168 B.C., Gentius, the Illyrian king, provoked the third Illyrian war, the result of which was the annexation of the whole country by the Romans. Frequent rebellions occurred, but at last the natives accepted the Roman civilization. During the empire, the country was one of the best recruiting grounds for the Roman legions; and in troubled times many Illyrian soldiers fought their way up from the ranks to the imperial purple. Claudius, Aurelian, Probus, Diocletian, and Maximian were all sons of Illyrian peasants.

In the time of the republic Illyricum comprised the country between the Liburnians, a kindred race, on the north and Epirus on the south. Under the empire the importance of the country made its name spread over all the surrounding districts. In the second century after Christ, the Illucricus Limes included Noricum, Pannonia, Mœsia, Dacia, and Thrace. Constantine added Greece, Epirus, and Macedonia, taking from it Thrace and part of Mœsia, and made it one of the four divisions of the Roman empire governed by a "præfectus prætorio." When the empire was divided, Illyricum was halved. Illyris Barbara or Romana, including Noricum, Pannonia, etc., was annexed to the Western empire; while Illyris Græca, including Macedonia, Epirus, and Greece, formed part of the Eastern empire. The Via Egnatia, the great line of road which connected Rome with Constantinople and the East, led across Illyricum from Dyrrachium to Thessalonica.

In the wreck of the Roman empire Illyria suffered severely. In the fourth century the Goths ravaged it repeatedly, but these, the most civilized of the barbarian invaders of Rome, with their warlike aristocracy, passed on, and were succeeded by wilder tribes. Slavs, as also Huns and other nomadic races from the East, in succession devastated the country. An agricultural population could no longer maintain itself, and all the elements of civilization disappeared. Justinian (527–565) tried in vain to defend the country by a series of forts; his armies were defeated time after time, and at last he allowed the Huns to make settlements south of the Danube. Rome gave up the defense of civilization against the inroads of barbarism, and bribed the barbarians to be quiet. Still the Via Egnatia was defended, as the artery of communication and the highway of commerce between Constantinople and the west. The open country, however, even south of the great road, was abandoned to the Slavs and Huns. The older Illyrians partly united with these races, partly went farther south, encroaching on the Greek people, and the name of one of their tribes, Albani, is preserved in the modern name of their descendants, the Albanians.

Heraclius (610–641 A.D.) settled Slavonic peoples all along the coast of Illyria as far south as Dyrrachium. The states which were thus created were of great importance in the Dark Ages. The republic of Narenta vied for a time with that of Venice; and the commerce of Ragusa was so rich that it has given its name to all wealthy merchant vessels or "argosies." The name of Illyria had by this time disappeared from history; and the country was now divided between these powerful merchant cities and the states of Bosnia, Croatia, Servia, Rascia, and Dalmatia. In literature the name was preserved, and the scene of Shakespeare's comedy *Twelfth Night* is laid in Illyria. Politically the name was revived in the beginning of this century, when the small kingdom of Illyria to the north of the Adriatic was constituted at the peace of Vienna, 1809. In 1849 the territorial distribution of the Austrian empire was remodeled, and Illyria again disappeared.

ILORI, or ILORIN (the Alourie of the Landers' expedition), an important town of the Yoruban territory of Western Africa, situated about sixty or seventy miles south of the Niger, and about 160 miles north-northeast of Lagos. Population, 150,000.

IMAGE-WORSHIP. In the present article the word "image" will be employed to denote any artificial representation, whether pictorial or sculptural, of any person or thing, real or imaginary, which is used as a direct adjunct of religious services.

As regards the attitude toward religious images assumed by the primitive Christian church, several questions have often been treated as one which cannot too carefully be kept quite apart. There can be no doubt, for example, that the early Christians were absolutely unanimous in utterly condemning all heathen image-worship and the various customs, many of them obviously immoral, with which it was associated; it is needless to multiply citations from the fathers in proof of so undisputed a fact. A form of iconolatry specially deprecated in the New Testament was the then prevalent adoration of the images of the reigning emperors. It is also tolerably certain that, if for no other reasons besides the fewness, obscurity and poverty of the early converts to Christianity, the works of art seen in their meeting houses cannot possibly at first have been numerous. Along with these reasons would certainly coöperate toward the exclusion of visible aids to devotion, not only the church's vivid recollection of what Christ had been, and its living sense of His continued real, though unseen, presence, but also, during the first years, its constant expectation of His second advent as imminent. In point of fact it was a common accusation brought against the Christians by their enemies that they had "no altars, no temples, no known images," that "they set up no image or form of any god," and this charge was never denied. At a comparatively early date indeed we read of various Gnostic sects calling in the fine arts to aid their worship; thus Irenæus, speaking of the followers of Marcellina, says: "They possess images, some of them painted, and others formed from different kinds of material; and they maintain that a likeness of Christ was made by Pilate at that time when Jesus lived among men. They crown these images, and set them up along with the images of the philosophers of the world; that is to say, with the images of Pythagoras and Plato and Aristotle and the rest. They have also other modes of honoring these images after the same manner of the Gentiles." It is also well known that the emperor Alexander Severus found a place for several Scripture characters and even for Christ in his lararium. But there is no evidence that such a use of images extended itself at that early period to orthodox Christian circles; and the presumption is all the other way. The first unmistakable indication of the actual public use of the painter's art for directly religious ends does not occur indeed until the year 306 A.D., when the synod of Elvira, Spain, decreed that "pictures ought not to be in a church, lest that which is worshiped and adored be painted on walls." The scope of this prohibition has been very differently viewed by interpreters—some thinking that all that is forbidden is any attempt at delineating the divine; others considering that the synod contemplated frescoes only and not pictures, which could be more readily hidden from profanation in times of persecution; others taking the canon in the broadest sense as directed against the exhibition in churches of pictures of sacred subjects. In any case, and particularly if the last theory be adopted, it is evident that the use of sacred pictures in public worship was not at the beginning of the fourth century a thing wholly unknown within the orthodox church in Spain; and the presumption is that in other places, about the same period, the custom was looked upon with a more tolerant eye. Indications of the existence of allied forms of sacred Christian art prior to this period are not wholly wanting. It seems possible to trace some of the older and ruder frescoes in the catacombs back to a very early century; and it is certain that Bible manuscripts were often copiously illuminated and illustrated even before the middle of the fourth century. An often-quoted passage from Tertullian shows that in his day the communion cup was wont to bear a representation of the Good Shepherd. Clement of Alexandria mentions the dove, fish, ship, lyre, anchor, as suitable devices for Christian signet rings.

During the fourth and following centuries the tendency to enlist the fine arts in the service of religion and the church may be said to have steadily advanced; not, however, so far as appears, with the formal sanction of any regular ecclesiastical authority, and certainly not without strong protests raised by more than one powerful voice. How far the Christian feeling of the fourth and fifth centuries was from being thoroughly settled in favor of the employment of the fine arts is instructively shown by such a case as that of Eusebius of Cæsarea, who, in reply to a request of Constantia, sister of Constantine, for a picture of Christ, wrote that it was unlawful to possess images pretending to represent the Savior, either in His divine or in His human nature, and added that to avoid the reproach of idolatry he had actually taken away from a lady friend the pictures of Paul and of Christ which she had. Nilus, the disciple and defender of Chrysostom, permitted the symbol of the cross in churches and also pictorial delineations of Old and New Testament history, but deprecated other symbols, pictures of martyrs, and, most of all, the representation of Christ. In the time of Gregory the Great the Western Church at last obtained something like an authoritative declaration on the vexed question about images, but in a sense not quite the same as that of the synod of Elvira. Serenus of Marseilles, on account of what he considered to be flagrant abuses, had ordered the removal and destruction of all sacred images within his diocese; this vigorous action called forth several letters from Pope Gregory, in which he utterly disapproved of that violent course, and, for the first time clearly drawing the distinction which has ever since been authoritative for the Roman Church, pointed out that "it is one thing to worship a picture and another to learn from the language of a picture what that is which ought to be worshiped. What those who can read learn by means of writing, that do the uneducated learn by looking at a picture. * * * That, therefore, ought not to have been destroyed which had been placed in the churches, not for worship, but solely for instructing the minds of the ignorant." Here it may be mentioned with regard to the symbol of the cross, that its public use dates from the time of Constantine, though, according to many Christian archæologists, it had, prior to that date, a very important place in the so-called "disciplina arcani." The introduction of the crucifix was decidedly later, and originally the favorite combination was that of the figure of a lamb lying at the foot of the cross; the Trullan council in 692 by its eighty-second canon enjoined that this symbol should be discontinued, and that where Christ was shown in connection with His cross He should be represented in His human nature.

It was not until the eighth century that the religious and theological questions which seem naturally to connect themselves with image-worship were at last distinctly raised in the Eastern Church in their entirety, and argued in what from some points of view might fairly be called an exhaustive manner. The controversy began with the edict by which Leo the Isaurian, in the tenth year of his reign (726), sought to deliver the church from what he called "the idolatry of image-worship." The text of that edict is not extant, but it seems to have been directed exclusively against such "idolatrous" homage as appeared to be involved in the established custom of prostration before them. The use of the strong word "idolatrous" at once led to a keen controversy, in which it was urged by the theologians that a "relative worship" might, without idolatry, be given to the image of Christ. Among those who took this ground was the famous John of Damascus, who retorted upon the iconoclastic emperor with charges of Judaizing and even of Manichæan leanings. Leo, unconvinced, but finding that his first edict had been wholly ineffectual, four years later (430) issued a second decree, of a more sweeping character than the first, inasmuch as all the holy images were ordered to be removed, and all recalcitrant bishops summarily ejected from their posts. This proceeding called forth further arguments from the theologian of Damascus, through whose influence the iconoclasts were anathematized in such churches as were not too directly and entirely under the political influence of Constantinople. At the same time (730) Pope Gregory II. addressed to the emperor two important controversial letters in favor of images. They are preserved in the *Acta* of the second council of Nice. Apart from their direct historical importance, they are of considerable interest as literary and theological curiosities. To the objection which had of course been urged from the decalogue, he replied that the prohibition there was directed simply against the idolatry of Canaan, and could not have been intended in a sense inconsistent with the fact that Moses had been commanded to make cherubim and the like. Christ Himself was an image, the image of God. The charge that the iconoduli prayed to stones, walls, and pictures was easily met; and the further difficulty that six œcumenical councils had met and separated, but enjoined nothing about images, it was held, told distinctly against the iconoclasts, for the same councils had equally failed to urge upon men the duty of taking their necessary food. Heedless of Gregory's remonstrances, the emperor continued, during the remaining twelve years of his life, to carry on the struggle with but little effect; the religious use of images was too intimately interwoven, not only with the church life, but also with the domestic habits of his people, to yield even to the most determined efforts of an arbitrary despotism.

In 741 Leo was succeeded by Constantine Copronymus (741–775), who fully shared the iconoclastic views of his father, and in 754 convoked a council, attended by 338 bishops, but never recognized as œcumenical, which under his influence declared all reverencers of images to be men who had lapsed into idolatry; decreed that "Christ in His glorified humanity, though not incorporeal, was yet exalted above all the limits and defects of a sensuous nature, too exalted therefore to be figured by human art in an earthly material after the analogy of any other human body;" and pronounced anathema on all who attempted to express by visible colors the form of the Logos in His incarnation, and on all who delineated dumb and lifeless pictures of the saints, which could never serve any profitable end. All images whatsoever of sacred persons or things were ordered to be ejected from Christian churches; and to set them up either in public or in private buildings was forbidden under the gravest ecclesiastical penalties. The stringency of these decrees was justified by arguments drawn from reason and Scripture, as well as by appeals to such names as those of Gregory, Chrysostom, Athanasius, Epiphanius, and Eusebius. The attempt to enforce the decisions of the council as imperial laws was in many instances marked by oppressiveness and cruelty, and the general feeling of the community, fostered diligently by a numerous class of its most energetic and pious members, the monks, continued unchanged in its aversion to iconoclasm; and, although at the end of his reign Constantine succeeded in imposing upon every citizen of Constantinople an oath never again to worship an image, there can be little doubt that in a vast number of households secret leanings to image worship had been intensified rather than weakened by repressive measures. During the early part of the brief reign (775–779) of Leo IV. Chazarus, the stringency of the law was somewhat relaxed, until it was discovered that the empress (Irene) was herself a secret iconolater, when she was brought into disgrace, and numbers of her accomplices were seized and imprisoned. On the death of Leo, Irene became regent for her infant son Constantine, and, as was to be expected, used the power which she now possessed in favor of the cause she had long had at heart. With the assistance of the monks, after an abortive attempt to hold a synod at Constantinople in 786, there met at Nice in 787 a general council (the seventh œcumenical) the proceedings of which are of considerable historical importance. It was there decided that, not only the figure of the cross, but also other holy images (Christ, the Virgin Mary, angels, and saints), whether painted or executed in mosaic or other material, might be set up in churches, placed on holy vessels and vestments, on walls and panels, in houses and by highways. The decrees, which were signed by all present, were afterward solemnly ratified at a final session (the eighth) held in Constantinople, and thus, after a struggle of sixty-one years, the worship of images asserted in the Greek Church that ascendancy which, with only one brief interruption of a few years, it has ever since maintained.

The decisions of this Eastern council were in full harmony with the personal views and practices of the popes, who, however, were compelled to show considerable moderation in the attitude they assumed. The Latin Church also, as is shown by the writings of Agobard of Lyons, and Claudius of Turin, contained strongly iconoclastic elements, which, if full scope had been given them, might conceivably have altered very considerably the current of Western opinion. On political as well as on religious grounds, however, it was felt to be inexpedient to push matters on either side to extremes; very important, therefore, at this juncture was the step taken by the emperor Charlemagne in the publication of his *De Impio Imaginum Cultu Libri IV.*, commonly called the *Libri Carolini*, in which, condemning alike the fanaticism of iconoclasts and the superstition of iconoduli, he maintained the right of images to exist for purposes of commemoration and ornament. At the synod of Frankfort-on-the-Main, held in 794, his general position was maintained, and adoration of images was wholly condemned. Great injustice was done, however, to the fathers of the second Nicene council when they were accused of maintaining that the same worship ought to be given to images of saints as to the Holy Trinity—a doctrine which they had been at special pains to repudiate. The settlement which had been obtained in 787 did not subsist entirely undisturbed even in the Eastern Church. In 815, two years after Leo the Armenian had ascended the throne, a council convoked by him at Constantinople formally abolished the decrees of Nice, and again banished the images from the churches. The new controversy, with which the name of Theodore of the Studium is still more prominently associated than was that of John of Damascus with its previous phase, went on with vicissitudes very similar to those which had formerly occurred during the reign of Leo and his successors Michael (820-830) and Theophilus (830-842). At length, during the regency of the empress Theodora, the decrees of Nice were reaffirmed by a synod at Constantinople, and the banished images were triumphantly and finally reintroduced into the metropolitan church on the day which on the first Sunday in Lent is still celebrated throughout the Greek Church as a great festival.

Down to the close of this period the "images" spoken of in ecclesiastical controversy are almost entirely pictures or mosaics—the religious use of sculptures, and particularly of statues, being little known, and, so far as known, disapproved.

At the period of the Reformation it was unanimously felt by the reforming party that, with the invocation of saints and the practice of reverencing their relics, the adoration of images ought also as a matter of course to cease. The leaders of the movement were not all, however, perfectly agreed on the question as to whether these might not in some circumstances be retained in churches. Luther, it is well known, had no sympathy with the iconoclastic outbreaks which history mentions as having taken place with some frequency at this period: he classes images in themselves as among the "adiaphora," and condemned only their cultus; so also the "Confessio Tetrapolitana" leaves Christians free to have them or not, if only due regard be had to what is expedient and edifying. The "Heidelberg Catechism," on the other hand, emphatically declares that images are not to be tolerated at all in churches. This position, which is that of all the reformed churches, has an obvious connection with their view as to the division of the decalogue, they following Origen on this question, while the Lutherans adhere to the Philonic arrangement.

At the council of Trent the Church of Rome finally formulated the doctrine on the subject of images which is still of authority within its communion. That doctrine is avowedly based on the decrees of the second council of Nice. It is declared that images of Christ, the Virgin Mary, and other saints are to be set up and retained, especially in churches, and that "due" honor and veneration are to be accorded them by kissing and prostration. Warnings are appended, however, against their superstitious abuse somewhat in the spirit of Gregory the Great's letter and of the decision of the Frankfort synod.

The Greek Church continues tenaciously to adhere to the decrees of the second Nicene council, and has not yielded to any of the artistic impulses which have elsewhere made themselves so powerfully felt. The sacred pictures which abound everywhere, and are treated with extraordinary reverence and affection, are for the most part very defective esthetically. Indeed, the preference seems to be given to those executed in rude archaic style, and even now the painter of pictures intended for religious uses must bear in mind the monk's famous criticism on Titian. Nude or incompletely draped figures are forbidden, and only half lengths are permitted. No representation of the Godhead or of the Trinity is attempted. Although it is in the records of a Constantinopolitan council that the earliest extant notice of the crucifix occurs, that symbol is not now used in the East.

IMÂM is the name given to the priest who leads the prayers of a Mahometan congregation, and is exactly equivalent to Antistes. In the Koran it is said of Abraham, "Verily, I will set thee as an imâm (high priest or model) for men." In Turkey the imâm, besides his function as a minister, performs the rites of circumcision, marriage, and burial. He is distinguished only by avoiding gay colors in his dress and wearing a white turban.

IMBROS, or IMVRO, an island in the Ægean Sea, lying west of the southern end of the Thracian Chersonese, about fourteen miles from the mouth of the Dardanelles. To the northwest, at a distance of seventeen miles, lies the island of Samothraki; and about the same distance to the southeast is Lemnos. The area of Imbros is estimated at 105 square miles, and its population, which is mainly of Greek origin, is about 10,000. With its bare mountain ridges and sides it has no small similarity to Attica.

IMERITIA, a district in Transcaucasia, extends from the left bank of the Tzhenys-tzkalys to the range of hills that separate it from Georgia on the east, and is bounded on the south by Akhalzikh.

IMMACULATE CONCEPTION. The dogma of the immaculate conception of the Virgin Mary, as held by the Church of Rome, is to the effect that "the most blessed Virgin was, in view of the merits of Jesus Christ the Savior of the human race, by the singular grace and favor of Almighty God, from the first moment of her conception in the womb of her mother, preserved free from all taint of original sin." The "pious opinion" that the mother of Christ had during her life been preserved from sin in a way in which no other human being ever had been may be traced back to a comparatively early period: indeed, without it her cultus (for some account of the growth of which see MARY) as it had developed itself long before the ninth century, would have been impossible. The actual history of an explicit doctrine of her immaculate conception, however, so far as has hitherto been discovered, may be said to begin, in the year 1140, with the letter of remonstrance which Bernard of Clairvaux wrote to the canons of the cathedral at Lyons, who, without consulting the Roman see, had recently introduced into their church a festival in celebration of that doctrine. Bernard argued vigorously against this on the ground of its novelty, its unscripturalness, and its absurdity. In the thirteenth century all the leading theologians, such as Alexander Halensis, Albertus Magnus, Bonaventura, and Thomas Aquinas, took the view of St. Bernard, their contribution to the theology of the subject consisting in an accurate definition of the moment at which the Virgin's sanctification in the womb must be held to have taken place. During the same century the feast of the Conception became very popular, and in 1263 it was accepted by a general chapter of the Franciscans at Pisa, without reference, however, to the question of immaculacy. Of great importance to the subsequent history of the dogma was the appearance in the theological world, toward the beginning of the fourteenth century, of Duns Scotus, the "subtle doctor" of the Franciscans, who, as in so many other points, so also in this, came into conflict with the still more illustrious "Doctor Angelicus," the Dominican Aquinas. In one part of his *Commentary* on the *Sentences* of Peter of Lombardy he declares for the thinkableness and even probability of Mary's having been preserved intact from original sin; in a later passage the doctrine is categorically stated. It was upon this disputed point that the long and bitter controversy between the two great mendicant orders chiefly turned.

In 1389, the Spanish Dominican Joannes de Montesono having maintained in a disputation at Paris that the view of the Scotists was unscriptural and heretical, the university, without committing itself on the main point, condemned his violent theses, and this condemnation was concurred in by the Avignon pope, Clement VII. The members of the entire Dominican order, for their refusal to acquiesce, were for several years excluded from the privileges of the university. In the beginning of the fifteenth century the famous chancellor, John Gerson, accepted the new dogma, and applied in its favor the well-known doctrine of development. At the council of Basel (in the thirty-sixth session, held September 17, 1439) it was defined and declared that the doctrine was consistent with faith, reason, and Scripture, and therefore to be approved and embraced; the contrary doctrine was not condemned, but it was forbidden to preach or to teach it. The university of Paris now made subscription to the doctrine of the Immaculate Conception a condition for its degrees, and various other universities entered into a solemn compact to use every exertion for its spread, but the controversy was far from having been brought to a close even by the action of Pope Sixtus IV., who in 1483 published a bull threatening with excommunication anyone who should accuse of heresy either the advocates or the impugners of the doctrine, the point having not yet been decided by the apostolical see. In its fifth session (1546) the council of Trent, after formulating its decree on the subject of original sin, sought to effect a compromise between Dominicans and Franciscans by appending a declaration that it did not intend that this doctrine should be applied to the blessed and immaculate Virgin Mary, but that the constitutions of Sixtus IV. were still to be observed. In the beginning of the seventeenth century the field of battle was transferred to Spain, where, under the predominant influence of the Franciscans and Jesuits, medals were struck, pictures painted, statues erected, and persecutions set on foot in honor of the Virgin; and embassies were sent to Rome, both by Philip III. and by Philip IV., to obtain more explicit recognition of the popular doctrine. The popes continued for a long time, however, to maintain their attitude of reserve. Paul V. (1617) forbade all public dispute on the subject, and Gregory XV. (1622) extended the prohibition even to private discussions, except in the case of Dominicans "*inter se.*" But gradually the papal sympathies became more pronounced under Jesuit influences; Clement IX. gave the feast of the Conception an octave; Clement XI., in 1708, made it a festival "de præcepto" for all Christendom; while Benedict XIV. endeavored to reconcile St. Bernard with the more modern tendencies of Roman Catholic theology, by insisting upon subtle distinctions between the "conceptio activa" and the "conceptio passiva" of Mary. In the pontificate of Gregory XVI. several prelates received papal permission to describe her conception as immaculate; and in 1849 Pius IX. was induced to address to his bishops from Gaeta an encyclical, inviting them to state how far the dogmatic definition of the dogma would meet their wishes and the wishes of those under their charge. A large majority declared themselves strongly in favor of the proposal, and the ultimate result was that on December 8, 1854, the pope, in presence of a numerous concourse of cardinals, patriarchs, archbishops, and bishops assembled in St. Peter's, Rome, solemnly promulgated the bull "Ineffabilis Deus," by which the doctrine of the Immaculate Conception finally became for the Roman communion an article of faith, the denial of which is accounted to be heresy.

The feast of the Immaculate Conception is observed in the Roman Church on December 8.

IMMERMANN, Karl Leberecht, dramatist and novelist, was born April 24, 1796, at Magdeburg. He died at Düsseldorf, August 25, 1840.

IMMORTELLE, or Everlasting. The immortelle plant belongs to the division *Tubulifloræ* of the natural family *Compositæ*, and is scientifically known as *Gnaphalium* (*Helichrysum*) *orientale* of Linnæus. It is a native of North Africa, Crete, and the parts of Asia bordering on the Mediterranean; and it is cultivated in many parts of Europe. The finest flowers are grown on the slopes of Bandols and Ciotat, where the plant begins to flower in June.

IMOLA, the ancient *Forum Cornelii*, a town of Italy, capital of a circle in the province of Bologna, is situated in a fruitful and charming plain on the old Æmilian way, near the river Santerno (ancient *Vatrenus*), twenty-one miles southeast of Bologna and forty-six northwest of Rimini, on the railway connecting those towns. Population, 11,372.

IMPEACHMENT, an exceptional and now rare form of procedure against criminals in England, in which the House of Commons are the prosecutors and the House of Lords the judges. It differs from procedure by bill of attainder, which follows the ordinary forms of legislation in both Houses, and takes effect in an Act of Parliament. In impeachment the form of procedure is strictly judicial. When the House of Commons has accepted a motion for impeachment, the mover is ordered to proceed to the bar of the House of Lords, and there impeach the accused "in the name of the House of Commons, and of all the Commons of the United Kingdom." The charges are formulated in articles, to each of which the accused may deliver a written answer. The prosecution must confine itself to the charges contained in the articles, though further articles may be adhibited from time to time. The Commons appoint managers to conduct the prosecution, but the whole House in committee attends the trial. The defendant may appear by counsel. The hearing takes place as in an ordinary trial, the defense being allowed to call witnesses if necessary, and the prosecution having a right of reply. At the end of the case the president "puts to each peer, beginning with the junior baron, the questions upon the first article, whether the accused be guilty of the crimes charged therein. Each peer in succession rises in his place when the question is put, and standing uncovered, and laying his right hand upon his breast, answers, 'Guilty' or 'Not guilty,' as the case may be, 'upon my honor.' Each article is proceeded with separately in the same manner." Should the accused be found guilty, judgment follows if the Commons move for it, but not otherwise. The Commons thus retain the power of pardon in their own hands, and this right they have in several cases expressly claimed by resolution. The last impeachments were those of Warren Hastings (1788–95) and Lord Melville (1805), but an unsuccessful attempt was made by Mr. Anstey to impeach Lord Palmerston in 1848. The earliest recorded instances of impeachment are those of Lord Latimer in 1376, and of Pole, earl of Suffolk, in 1386.

In the constitution of the United States the procedure of impeachment is thus brought about. The House of Representatives are the accusers, and appoint managers to conduct the prosecution at the bar of the Senate. The vote of the senate is taken by putting the question separately to each member, and a majority of two-thirds is required for a conviction. In the separate States it partakes of the same quasi-political character — neither the prosecutors nor the judges being the same as in ordinary criminal offenses. The most noted instances of impeachment in the United States are those of Associate Justice Chase in 1804, of President Andrew Johnson in 1868, and of Judge Barnard, New York, in 1872. The object of impeachment is the removal of public officers for malversation in office, which is followed sometimes by disqualification for any future appointment.

INCENSE is the perfume (fumigation) arising from certain resins and gum-resins, barks, woods, dried flowers, fruits, and seeds, when burnt, and also the substances so burnt. In its literal meaning the word "incense" is one with the word "perfume," the aroma given off with the smoke of any odoriferous substance when burnt. But, in use, while the meaning of the word "perfume" has been extended so as to include everything sweet in smell, from smoking incense to the invisible fresh fragrance of fruits and exquisite scent of flowers, that of the word "incense" in all the languages of modern Europe in which it occurs, has, by an opposite process of limitation, been gradually restricted almost exclusively to frankincense. Frankincense has always been obtainable in Europe in greater quantity than any other of the aromatics imported from the East; it has therefore gradually come to be the only incense used in the religious rites and domestic fumigations of many countries of the West, and at last to be popularly regarded as the only "true" or "genuine" (*i. e.* "franc") incense.

Probably nowhere can the actual historical progress from the primitive use of animal sacrifices to the later refinement of burning incense be more clearly traced than in the pages of the Old Testament, where no mention of the latter solemnity occurs before the period of the Mosaic legislation; but in the monuments of ancient Egypt the authentic traces of the use of incense which still exist carry us back to a much earlier date. From Meroe to Memphis the commonest subject carved or painted in the interiors of the temples is that of some contemporary Phrah or Pharaoh worshiping the presiding deity with oblations of gold and silver vessels, rich vestments, gems, the firstlings of the flock and herd, cakes, fruits, flowers, wine, anointing oil, and incense. Generally he holds in one hand the censer, and with the other darts the pastils or osselets of incense into it; sometimes he offers incense in one hand and makes the libation of wine with the other. The ancient Egyptians used various substances as incense. They worshipped Ra at sunrise with resin, at mid-day with myrrh, and at sunset with an elaborate confection called *kuphi*, compounded of no fewer than sixteen ingredients, among which were honey, wine, raisins, resin, myrrh, and sweet calamus. While it was being mixed, holy writings were read to those engaged in the operation. The censer used was a hemispherical cup or bowl of bronze, supported by a long handle, fashioned at one end like an open hand, in which the bowl was, as it were, held, while the other end within which the pastils of incense were kept was shaped into a hawk's head crowned with a disk, as the symbol of Ra. In embalming their dead the Egyptians filled the cavity of the belly with every sort of spicery, except frankincense, which was regarded as specially consecrated to the worship of the gods.

Homer tells us that the Egyptians of his time were emphatically a nation of druggists. This characteristic, in which, as in many others, they remarkably resemble the Hindus, the Egyptians have maintained to the present day; and, although they have changed their religion, the use of incense among them continues to be as familiar and formal as ever.

In the authorized version of the Bible, the word "incense" translates two wholly distinct Hebrew words. In various passages in the latter portion of Isaiah, in Jeremiah, and in Chronicles, it represents the Hebrew *lebonah*, more usually rendered "frankincense;" elsewhere the original word is *ketoreth*, a derivative of the verb *kitter* or *hiktir*, which verb is used, not only in Ex. xxx. 7, but also in Lev. i. 9, iii. 11, ix. 13, and many other passages, to denote the process by which "the savor of satisfaction" in any burnt offering, whether of flesh or incense, is produced.

The Jews were also in the habit of using odoriferous substances in connection with the funeral obsequies of distinguished persons.

No perfectly satisfactory traces can be found of the use of incense in the ritual of the Christian Church during the first four centuries. It obviously was not contemplated by the author of the epistle to the Hebrews; its use was foreign to the synagogue services on which, and not on those of the temple, the worship of the primitive Christians is well known to have been originally modeled; and its associations with heathen solemnities, and with the evil repute of those who were were known as "thurificati," would still further militate against its employment. Various authors of the ante-Nicene period have expressed themselves as distinctly unfavorable to its religious, though not of course to its domestic, use.

The character and order of these historical notices of incense would certainly, were there nothing else to be considered, justify the conclusion which has been generally adopted, that its use was wholly unknown in the worship of the Christian Church before the fifth century. On the other hand, we know that in the first Christian services held in the catacombs under the city of Rome, incense was burnt as a sanitary fumigation at least. It is natural that little should be said of so obvious a practice until the fuller development of ritual in a later age. The slighting references to it by the Christian fathers are no more an argument against its existence in the primitive church than the similar denunciations by the Jewish prophets of burnt offerings and sacrifices are any proof that there were no such rites as the offering of incense, and of the blood of bulis and fat of rams, in the worship of the temple at Jerusalem. There could be no real offense to Christians in the burning of incense.

The missal of the Roman Church now enjoins incensation before the introit, before the gospel, and again at the offertory, in every high mass; the use of incense also occurs when the sacrament is exhibited, at consecrations of churches and the like, in processions, in the office for the burial of the dead, and at the exhibition of relics. On high festivals the altar is censed at vespers and lauds.

In the Church of England the use of incense was gradually abandoned after the reign of Edward VI., until the ritualistic revival of the present day. Its use, however, has never been abolished by law.

For the manufacture of the incense now used in the Christian churches of Europe there is no fixed rule. The books of ritual are agreed that Ex. xxx. 34 should be taken as a guide as much as possible. It is recommended that frankincense should enter as largely as possible into its composition, and that if inferior materials be employed at all they should not be allowed to preponderate. In Rome olibanum alone is employed; in other places benzoin, storax, aloes, cascarilla bark, cinnamon, cloves, and musk are all said to be occasionally used. In the Russian Church, benzoin is chiefly employed. The Armenian liturgy, in its benediction of the incense, speaks of "this perfume prepared from myrrh and cinnamon."

The preparation of pastils of incense has probably come down in a continuous tradition from ancient Egypt, Babylonia, and Phœnicia. Cyprus was for centuries famous for their manufacture, and they were still known in the middle ages by the names of pastils or osselets of Cyprus.

Maimonides, in his *More Nevochim*, states that the use of incense in the worship of the Jews originated as a corrective of the disagreeable odors arising from the slaughter and burning of the animals offered in sacrifice. There can be no doubt that its use throughout the East is based on sanitary considerations; and in Europe even, in the time when the dead were buried in the churches, it was recognized that the burning of incense served essentially to preserve their salubrity.

INCEST, carnal connection between persons so related that marriage could not take place between them according to the Levitical rules. In England incest has not generally been treated as a crime, although, along with other offenses against morals, it was made punishable by death in 1650. Since the Restoration it has, to use Blackstone's phrase, been left to the "feeble coercion of the spiritual courts." Under the divorce law, incest is one of the aggravations of adultery which entitle a wife to divorce her husband. In the law of Scotland, it is a crime nominally punishable with death, but the penalty usually inflicted is penal servitude for life. This sentence was actually pronounced on a man in 1855. In the United States, as in England, incest is not an indictable offense at common law, but it has been made so by the legislation of some of the States.

INCHBALD, Mrs. Elizabeth, an English actress, dramatic author, and novelist, was born October 15, 1753. She died at Kensington, August 1, 1821. Mrs. Inchbald's plays amount to nineteen in all.

INCUBATION. See Birds and Reproduction. For Artificial Incubation, see Poultry.

INDEPENDENCE, capital of Jackson county, Mo., is situated ten miles east of Kansas City, at the intersection of several railroads, and four miles from the Missouri river. It was formerly the starting-point for emigrants crossing the plains, and is an important shipping center. It has a national and other banks, nine churches, one daily and two weekly newspapers, flouring-mill, a woolen-mill, broom factory and many fine residences. Population (1900), 6,974.

INDEPENDENCE, DECLARATION OF. The immortal document which is known by this name was drafted by Thomas Jefferson, amended slightly by his colleagues of the committee of the Continental Congress, and reported and adopted on July 4, 1776. On June 7th of that year Richard Henry Lee, of Virginia, offered in the name of his State a resolution in Congress:

"That these united colonies are, and of right ought to be, free and independent States."

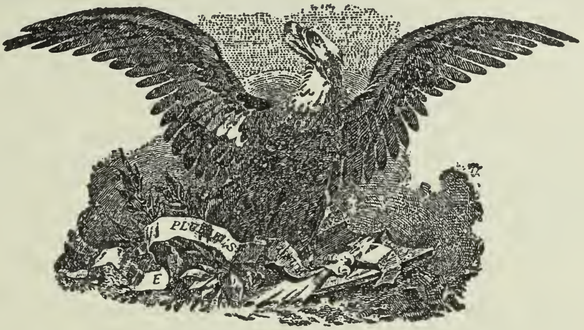
This resolution was seconded by John Adams, of Massachusetts; the debate upon which began on the following day, and continued two days.

On July 2, 1776, Lee's resolution was called up, and delegates from twelve colonies (New York not voting) unanimously declared "that these united colonies are, and of right ought to be, free and independent States."

But as the declaration was not reported and adopted until July 4th, the anniversary of independence was fixed on that day. The document, which had been relegated to a committee for preparation, is as follows:

> When, in the course of human events, it becomes necessary for one people to dissolve the political bands which have connected them with another, and to assume, among the powers of the earth, the separate and equal station to which the laws of nature and of nature's God entitle them, a decent respect to the opinions of mankind requires that they should declare the causes which impel them to the separation.
>
> We hold these truths to be self-evident: that all men are created equal, that they are endowed by their Creator with certain inalienable rights; that among these are life, liberty, and the pursuit of happiness. That to secure these rights, governments are instituted among men, deriving their just powers from the consent of the governed; that whenever any form of government becomes destructive of these ends, it is the right of the people to alter or abolish it, and to institute a new government, laying its foundation on such principles, and organizing its powers in such form, as to them shall seem most likely to effect their safety and happiness. Prudence, indeed, will dictate that governments long established should not be changed for light and transient causes; and accordingly all experience hath shown that mankind are more disposed to suffer, while evils are sufferable, than to right themselves by abolishing the forms to which they are accustomed. But when a long train of abuses and usurpations, pursuing invariably the same object, evinces a design to reduce them under absolute despotism, it is their right, it is their duty, to throw off such government, and to provide new guards for their future security. Such has been the patient sufferance of these colonies; and such is now the necessity which constrains them to alter their former systems of government. The history of the present King of Great Britain is a history of repeated injuries and usurpations, all having in direct object the establishment of an absolute tyranny over these States. To prove this, let facts be submitted to a candid world.
>
> He has refused his assent to laws the most wholesome and necessary for the public good.
>
> He has forbidden his Governors to pass laws of immediate and pressing importance, unless suspended in their operation till his assent should be obtained; and when so suspended he has utterly neglected to attend to them. He has refused to pass other laws for the accommodation of large districts of people, unless those people would relinquish the right of representation in the Legislature—a right inestimable to them, and formidable to tyrants only.
>
> He has called together legislative bodies at places unusual, uncomfortable, and distant from the depository of their public records, for the sole purpose of fatiguing them into compliance with his measures.
>
> He has dissolved representative houses repeatedly, for opposing, with manly firmness, his invasions on the rights of the people.
>
> He has refused, for a long time after such dissolutions, to cause others to be elected; whereby the legislative powers, incapable of annihilation, have returned to the people at large for their exercise, the State remaining, in the meantime, exposed to all the dangers of invasion from without and convulsions within.
>
> He has endeavored to prevent the population of these States; for that purpose obstructing the laws for naturalization of foreigners; refusing to pass others to encourage their migration hither, and raising the condition of new appropriations of lands.

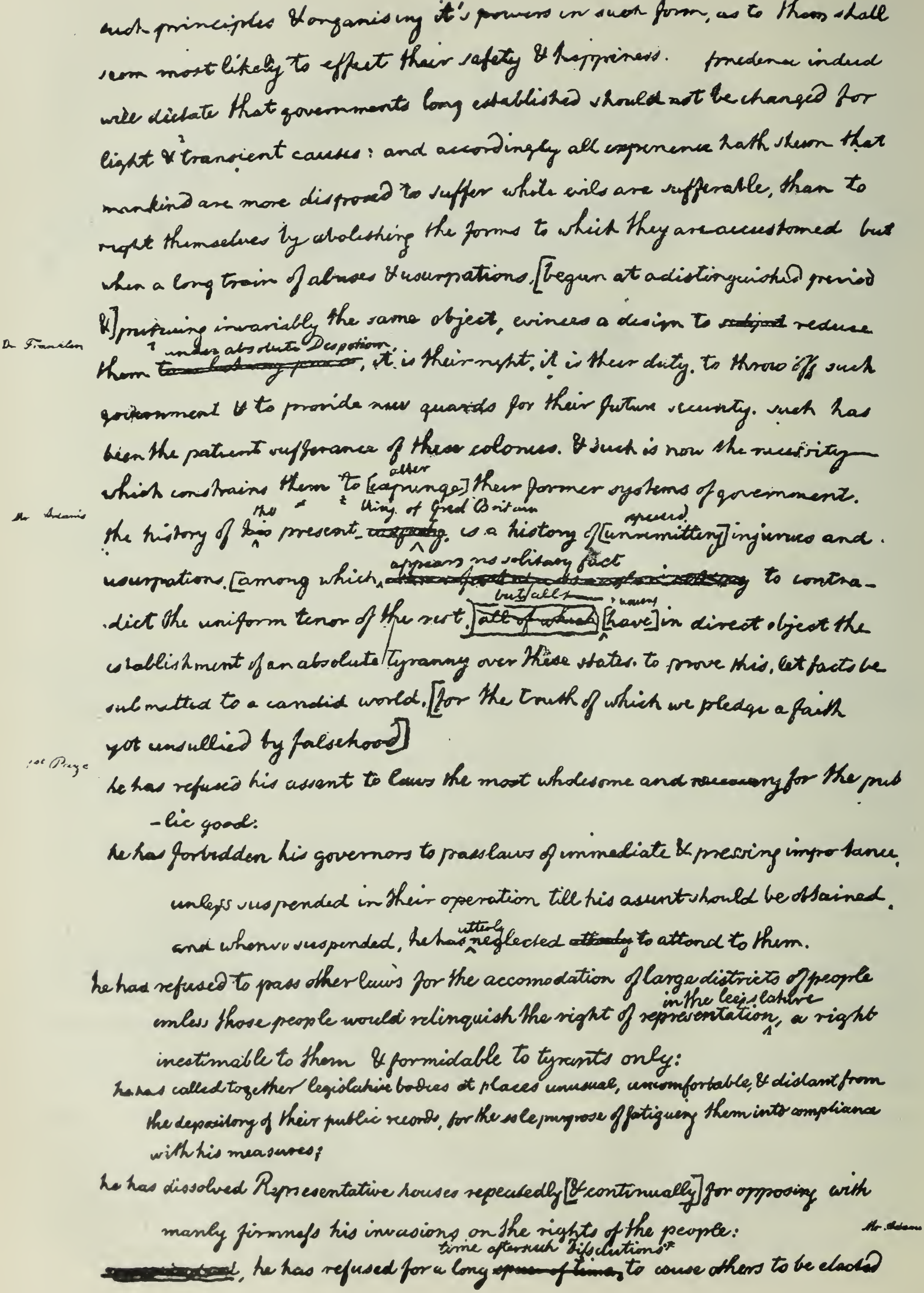
Declaration of Independence.



A Declaration by the Representatives of the UNITED STATES OF AMERICA. in General Congress assembled

When in the course of human events it becomes necessary for one ~~a~~ people to dissolve the political bands which have connected them with another, and to [~~[illegible]~~] assume among the powers of the earth the separate and equal ~~equal & independant~~ station to which the laws of nature & of nature's god entitle them, a decent respect to the opinions of mankind requires that they should declare the causes which impel them to ~~the change~~ the separation.

We hold these truths to be self-evident; ~~sacred & undeniable~~; that all men are created equal; ~~& independant~~; that they are endowed by their creator with ~~equal~~ [~~from that equal creation they derive~~] ~~rights some of which are~~ ~~rights~~; certain [inherent &] inalienable rights; that among ~~which~~ these are ~~the preservation of~~ life, ~~&~~ liberty, & the pursuit of happiness; that to secure these rights ~~ends~~, governments are instituted among men, deriving their just powers from the consent of the governed; that whenever any form of government ~~shall~~ becomes destructive of these ends, it is the right of the people to alter or to abolish it, & to institute new government, laying it's foundation on



such principles & organising it's powers in such form, as to them shall seem most likely to effect their safety & happiness. prudence indeed will dictate that governments long established should not be changed for light & transient causes: and accordingly all experience hath shewn that mankind are more disposed to suffer while evils are sufferable, than to right themselves by abolishing the forms to which they are accustomed. but when a long train of abuses & usurpations, [begun at a distinguished period &]pursuing invariably the same object, evinces a design to ~~subject~~ reduce

Dr. Franklin

them under absolute Despotism ~~to arbitrary power~~, it is their right, it is their duty, to throw off such government & to provide new guards for their future security. such has been the patient sufferance of these colonies; & such is now the necessity which constrains them to alter [expunge] their former systems of government.

Mr. Adams

the history of the ~~his~~ present King of Great Britain ~~majesty~~ is a history of repeated [unremitting] injuries and usurpations, [among which appears no solitary fact ~~no one fact stands single or solitary~~ to contradict the uniform tenor of the rest, but all have ~~all of which~~ [have] in direct object the establishment of an absolute tyranny over these states. to prove this, let facts be submitted to a candid world, [for the truth of which we pledge a faith yet unsullied by falsehood]

1st Page

he has refused his assent to laws the most wholesome and necessary for the public good:

he has forbidden his governors to pass laws of immediate & pressing importance, unless suspended in their operation till his assent should be obtained; and when so suspended, he has utterly neglected ~~utterly~~ to attend to them.

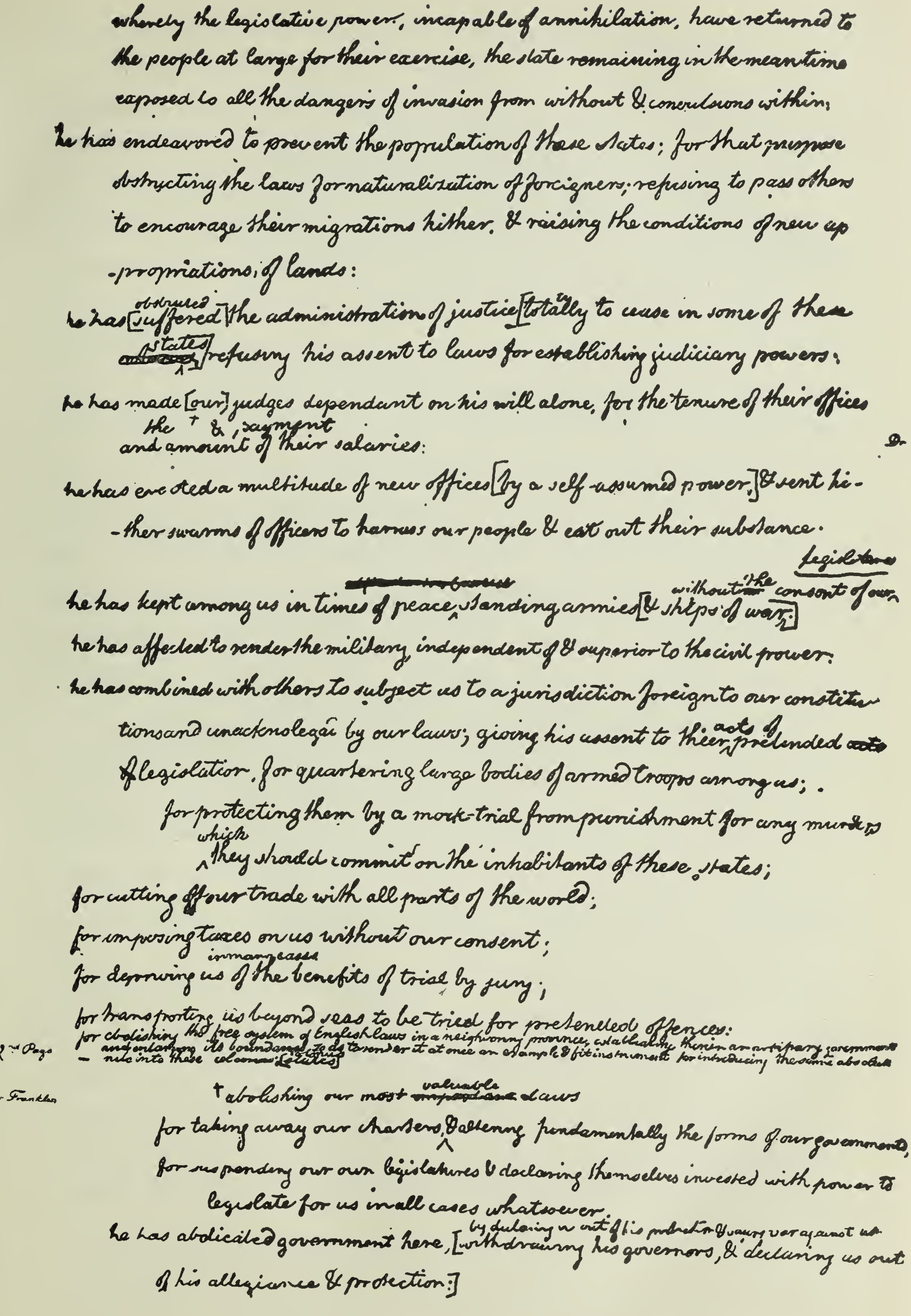
he has refused to pass other laws for the accomodation of large districts of people unless those people would relinquish the right of representation in the legislature, a right inestimable to them & formidable to tyrants only:

he has called together legislative bodies at places unusual, uncomfortable, & distant from the depository of their public records, for the sole purpose of fatiguing them into compliance with his measures;

he has dissolved Representative houses repeatedly [& continually] for opposing with manly firmness his invasions on the rights of the people:

Mr. Adams

~~[illegible]~~, he has refused for a long time after such dissolutions ~~space of time~~ to cause others to be elected



whereby the legislative power, incapable of annihilation, have returned to the people at large for their exercise, the state remaining in the mean time exposed to all the dangers of invasion from without & convulsions within:

he has endeavored to prevent the population of these states; for that purpose obstructing the laws for naturalisation of foreigners; refusing to pass others to encourage their migrations hither; & raising the conditions of new appropriations of lands:

he has obstructed [suffered] the administration of justice [totally to cease in some of these ~~colonies~~ states] refusing his assent to laws for establishing judiciary powers:

he has made [our] judges dependant on his will alone, for the tenure of their offices the + & paiment and amount of their salaries:

Dr. Franklin

he has erected a multitude of new offices [by a self-assumed power] & sent hither swarms of officers to harrass our people & eat out their substance.

he has kept among us in times of peace ~~[illegible]~~ standing armies [& ships of war] without ~~the~~ the consent of our legislatures

he has affected to render the military independent of & superior to the civil power:

he has combined with others to subject us to a jurisdiction foreign to our constitutions and unacknoleged by our laws; giving his assent to their acts of pretended ~~acts~~ of legislation, for quartering large bodies of armed troops among us;

for protecting them by a mock-trial from punishment for any murders which they should commit on the inhabitants of these states;

for cutting off our trade with all parts of the world;

for imposing taxes on us without our consent;

for depriving us of the benefits of trial by jury in many cases;

for transporting us beyond seas to be tried for pretended offences:

2nd Page

for abolishing the free system of English laws in a neighbouring province, establishing therein an arbitrary government and enlarging its boundaries so as to render it at once an example & fit instrument for introducing the same absolute rule into these ~~colonies~~ [states]

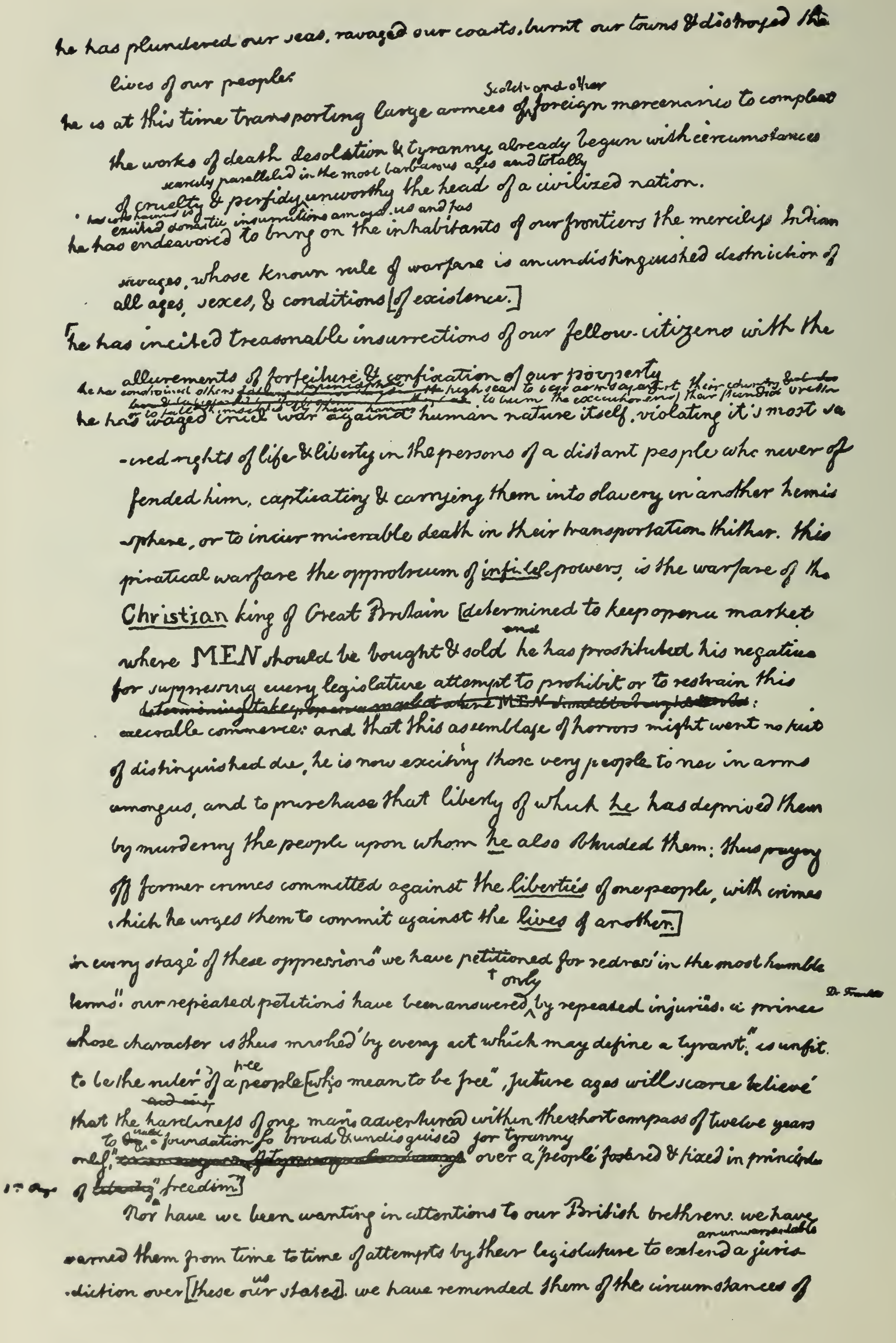
Dr. Franklin

+ abolishing our most ~~important~~ valuable laws

for taking away our charters, & altering fundamentally the forms of our governments,

for suspending our own legislatures & declaring themselves invested with power to legislate for us in all cases whatsoever.

he has abdicated government here, by declaring us out of his protection & waging war against us [withdrawing his governors, & declaring us out of his allegiance & protection:]



he has plundered our seas, ravaged our coasts, burnt our towns & destroyed the
lives of our people.

Scotch and other
he is at this time transporting large armies of foreign mercenaries to compleat
the works of death desolation & tyranny already begun with circumstances
scarcely paralleled in the most barbarous ages and totally
of cruelty & perfidy unworthy the head of a civilized nation.
excited domestic insurrections amongst us and has
he has endeavored to bring on the inhabitants of our frontiers the merciless Indian
savages, whose known rule of warfare is an undistinguished destruction of
all ages, sexes, & conditions [of existence.]

[he has incited treasonable insurrections of our fellow-citizens with the
allurements of forfeiture & confiscation of our property
he has constrained others ~~falling into his hands taken captives on the high seas~~ to bear arms against their country & to become the executioners of their friends & brethren
or to fall themselves by their hands.]
he has waged cruel war against human nature itself, violating it's most sa-
-cred rights of life & liberty in the persons of a distant people who never of-
fended him, captivating & carrying them into slavery in another hemis-
-phere, or to incur miserable death in their transportation thither. this
piratical warfare the opprobrium of infidel powers, is the warfare of the
Christian king of Great Britain [determined to keep open a market
and
where MEN should be bought & sold he has prostituted his negative
for suppressing every legislative attempt to prohibit or to restrain this
~~determining to keep open a market where MEN should be bought & sold~~:
execrable commerce: and that this assemblage of horrors might want no fact
of distinguished die, he is now exciting those very people to rise in arms
among us, and to purchase that liberty of which he has deprived them
by murdering the people upon whom he also obtruded them: thus paying
off former crimes committed against the liberties of one people, with crimes
which he urges them to commit against the lives of another.]

in every stage of these oppressions we have petitioned for redress in the most humble
only
terms: our repeated petitions have been answered by repeated injuries. a prince Dr Franklin
whose character is thus marked by every act which may define a tyrant, is unfit
free
to be the ruler of a people [who mean to be free. future ages will scarce believe
~~and daring~~
that the hardiness of one man, adventured within the short compass of twelve years
to ~~lay~~ build a foundation so broad & undisguised for tyranny
only, ~~[illegible]~~ over a people fostered & fixed in principles
1st Page of ~~liberty~~ freedom.]

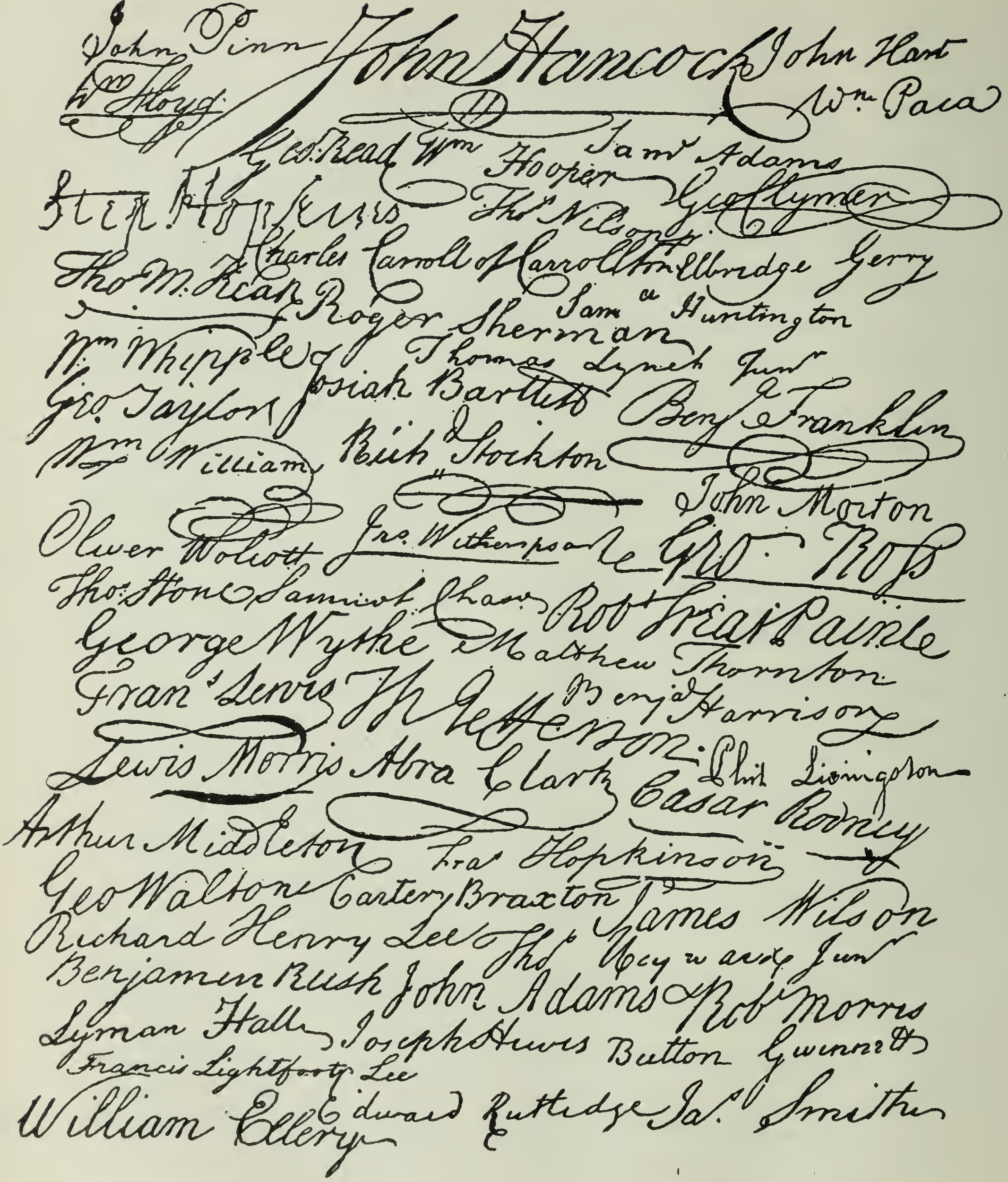
Nor have we been wanting in attentions to our British brethren. we have
an unwarrantable
warned them from time to time of attempts by their legislature to extend a juris-
-diction over [these our us states]. we have reminded them of the circumstances of

our emigration & settlement here, [no one of which could warrant so strange a pretension: that these were effected at the expence of our own blood & treasure, unassisted by the wealth or the strength of Great Britain: that in constituting indeed our several forms of government, we had adopted one common king, thereby laying a foundation for perpetual league & amity with them: but that submission to their parliament was no part of our constitution, nor ever in idea if history may be credited: and] we have appealed to their native justice & magnanimity & we have conjured them by [as well as to] the ties of our common kindred to disavow these usurpations which would inevitably [were likely to] interrupt our connection & correspondence ~~& connection~~. they too have been deaf to the voice of justice & of consanguinity, We must therefore [& when occasions have been given them, by the regular course of their laws, of removing from their councils the disturbers of our harmony, they have by their free election re-established them in power. at this very time too they are permitting their chief magistrate to send over not only soldiers of our common blood, but Scotch & foreign mercenaries to invade & destroy us ~~deluge us in blood~~. these facts have given the last stab to agonizing affection, and manly spirit bids us to renounce for ever these unfeeling brethren. we must endeavor to forget our former love for them, and to hold them as we hold the rest of mankind, enemies in war, in peace friends. we might have been a free & a great people together; but a communication of grandeur & of freedom it seems is below their dignity. be it so, since they will have it: the ~~road to glory~~ road to ~~glory &~~ happiness & to glory is open to us too; we will ~~must~~ ~~climb~~ tread it ~~in~~ apart from them, ~~a separate state~~, and] we must therefore acquiesce in the necessity which ~~pro~~ denounces our ~~ever-lasting Adieu~~ [~~eternal~~] separation! and hold them as we hold the rest of mankind enemies in war, in peace friends

Dr. Franklin

We therefore the representatives of the United States of America in General Congress assembled appealing to the supreme judge of the world for the rectitude of our intentions do in the name & by authority of the good people of these colonies [states,] [reject and renounce all allegiance & subjection to the kings of Great Britain & all others who may hereafter claim by, through, or under them; we utterly dissolve & ~~break off~~ all political connection which may ~~have~~ heretofore have subsisted between us & the people or parliament of Great Britain; and finally we do assert and declare these colonies to be free and independant states, and that as free & independant states they ~~shall hereafter~~ have full power to levy war, conclude peace, contract alliances, establish commerce, & to do all other acts and things which independant states may of right do. And for the support of this declaration] we mutually pledge to each other our lives, our fortunes & our sacred honour.

4th Page



John Penn John Hancock John Hart
Wm Floyd Wm Paca
Geo: Read Wm Hooper Saml Adams
Step. Hopkins Thos Nelson jr. Geo Clymer
Charles Carroll of Carrollton Elbridge Gerry
Thos M:Kean Roger Sherman Saml Huntington
Wm Whipple Thomas Lynch Junr
Geo Taylor Josiah Bartlett Benj Franklin
Wm Williams Richd Stockton
John Morton
Oliver Wolcott Jno Witherspoon Geo Ross
Thos Stone Samuel Chase Robt Treat Paine
George Wythe Matthew Thornton
Fran Lewis Th Jefferson Benja Harrison
Lewis Morris Abra Clark Phil Livingston
Cæsar Rodney
Arthur Middleton Fras Hopkinson
Geo Walton Carter Braxton James Wilson
Richard Henry Lee Thos Heyward Junr
Benjamin Rush John Adams Robt Morris
Lyman Hall Joseph Hewes Button Gwinnett
Francis Lightfoot Lee
William Ellery Edward Rutledge Jas Smith

He has obstructed the administration of justice, by refusing his assent to laws for establishing judiciary powers.

He has made judges dependent on his will alone, for the tenure of their offices, and the amount and payment of their salaries.

He has erected a multitude of new offices, and sent hither swarms of officers, to harass our people and eat out their substance.

He has kept among us, in times of peace, standing armies, without the consent of our Legislatures.

He has affected to render the military independent of and superior to the civil power.

He has combined with others to subject us to a jurisdiction foreign to our Constitution, and unacknowledged by our laws, giving his assent to their acts of pretended legislation:

For quartering large bodies of armed troops among us;

For protecting them, by a mock trial, from punishment for any murders which they should commit on the inhabitants of these States;

For cutting off our trade with all parts of the world;

For imposing taxes on us without our consent;

For depriving us, in many cases, of the benefits of trial by jury;

For transporting us beyond seas to be tried for pretended offenses;

For abolishing the free system of English laws in a neighboring province, establishing therein an arbitrary government, and enlarging its boundaries, so as to render it at once an example and fit instrument for introducing the same absolute rule into these colonies;

For taking away our charters, abolishing our most valuable laws, and altering, fundamentally, the forms of our governments;

For suspending our own Legislatures, and declaring themselves invested with power to legislate for us in all cases whatsoever.

He has abdicated government here, by declaring us out of his protection, and waging war against us.

He has plundered our seas, ravaged our coasts, burnt our towns, and destroyed the lives of our people.

He is at this time transporting large armies of foreign mercenaries to complete the works of death, desolation and tyranny, already begun with circumstances of cruelty and perfidy, scarcely paralleled in the most barbarous ages, and totally unworthy the head of a civilized nation.

He has constrained our fellow citizens, taken captive on the high seas, to bear arms against their country, to become the executioners of their friends and brethren, or to fall themselves by their hands.

He has excited domestic insurrections among us, and has endeavored to bring on the inhabitants of our frontiers the merciless Indian savages, whose known rule of warfare is an undistinguished destruction of all ages, sexes and conditions.

In every stage of these oppressions we have petitioned for redress in the most humble terms; our repeated petitions have been answered only by repeated injury. A prince whose character is thus marked by every act which may define a tyrant is unfit to be the ruler of a free people.

Nor have we been wanting in attentions to our British brethren. We have warned them, from time to time, of attempts by their legislature to extend an unwarrantable jurisdiction over us. We have reminded them of the circumstances of our emigration and settlement here. We have appealed to their native justice and magnanimity, and we have conjured them by the ties of our common kindred to disavow these usurpations which would inevitably interrupt our connections and correspondence. They, too, have been deaf to the voice of justice and consanguinity. We must, therefore, acquiesce in the necessity which denounces our separation, and hold them, as we hold the rest of mankind—enemies in war, in peace, friends.

We, therefore, the representatives of the United States of America, in general congress assembled, appealing to the Supreme Judge of the world for the rectitude of our intentions, do, in the name and by the authority of the good people of these colonies, solemnly publish and declare, that these united colonies are, and of right ought to be, free and independent states; that they are absolved from all allegiance to the British crown, and that all political connection between them and the state of Great Britain is and ought to be totally dissolved; and that, as free and independent states, they have full power to levy war, conclude peace, contract alliances, establish commerce, and do all other acts and things which independent states may of right do. And for the support of this declaration, with a firm reliance on the protection of Divine Providence, we mutually pledge to each other our lives, our fortunes, and our sacred honor.

JOHN HANCOCK,
President of Congress and Delegate from Massachusetts.

INDEPENDENTS, a religious denomination whose distinctive ecclesiastical principle is that the individual congregation or church is a society strictly voluntary and autonomous, standing directly under the authority of Jesus Christ, living in immediate dependence on Him, and responsible to Him alone for its beliefs and acts as a Christian society. Its ideal stands distinguished, on the one hand, from Episcopacy by having no gradations of ministerial or clerical orders, or persons above the individual congregation invested with administrative or judicial authority, and, on the other hand, from Presbytery by having no gradation of courts or representative bodies possessed of legislative and judicial functions. These distinctions imply others. Episcopacy and Presbytery are essentially organized and incorporative systems, building all the societies they comprehend into a political unity, but Independency is essentially voluntary and individualizing, satisfied with a spiritual unity, refusing to permit its various societies to be built into a political organism, lest it should do violence to the rights of conscience, or prevent or even supersede the duty of the exercise by the individual of his own judgment in matters of religion.

Independency rose in the reign of Elizabeth, and may be said to have been born of the despair of seeing religion reformed and vivified on any one of the then followed lines. The peculiar condition of the Anglican Church at this period is well enough known. There were men in it who wished it to be independent of Rome, but to remain as far as possible Catholic while Anglican, and there were men who wished it to be conformed in doctrine and polity to those churches of the Continent that were by preëminence the Reformed. These latter were the Puritans, and their endeavor was to reform the church through the state, to persuade or compel the constitutive and sovereign will to make it such as they could conscientiously approve. But it was inevitable in a time of strong religious feeling that some more daring spirits should endeavor to break through the anomalies of the Puritan position. If their consciences demanded, and the civil authority refused, reform, was it either right or dutiful to submit to the civil authority as against the conscience? Was there no other way of reformation than by its consent? Was the Christian man relieved from all responsibility and obligation to obey conscience when the magistrate forbade him to do so? In so forbidding, was not the magistrate stepping out of his own province? Was the church he could so rule as to prevent the realization of the Scriptural ideal a rightly conceived and constituted church? Was it the apostolical way so to work as to plant, to purge, to organize churches only as Cæsar gave consent? And could any but the apostolical way be right?

These were the questions that created Independency. In the writings of the first Independent, Robert Browne, lies the first crude attempt at an answer. He is possessed with the idea that reformation is necessary, and is to be accomplished, not by the state, but by the action and coöperation of men who are themselves reformed and renewed. The Puritans have committed two great mistakes: they have imagined that reformation is a thing of polity only, to be carried out by changes in the organism, as it were, or structure of the church, leaving many, perhaps the immense majority, of the individuals who constitute it unreformed; and they have waited and are waiting to have the work done through and by the magistrate. Browne sets himself absolutely against both positions.

But the problems that had exercised Browne were too vital to religion to be his alone. They occupied many minds, and of these not a few looked in a similar direction for a solution. Geneva was at once the strength and the weakness of the Puritans—their strength, because it gave them their ideal realized; their weakness, because it made them think that the only method of realization was in and through the State. The early Independents believed it possible to reform religion in England, and they acted on their belief, separating themselves from the Anglican Church, forming themselves into communities on what they regarded as the Scriptural model, and working in what was conceived to be the apostolic method. But separation from the church was a capital crime, equal to a denial of the royal supremacy; and so every inveterate separatist became liable to death. And early Independency was not without its martyrs. In the summer of 1583 two men, Thacker and Coppin, were executed at Bury St. Edmunds for refusing to conform to the church, and "dispersinge of Brownes bookes and Harrisons bookes." They justified their refusal on the ground that "her Majestie was chieffe ruler civilie, but no further." Two much more remarkable men, who met with a similar fate, were John Greenwood and Henry Barrowe.

In spite of the severely repressive measures of the government, the Independents continued to multiply. In the last decade of the sixteenth century numerous separatist communities were formed, especially in London and the eastern and northeastern counties. Their conventicles were often surprised, and in 1596 it was reckoned that as many as twenty-four had died in prison, representing, of course, but a small proportion of those actually confined. Plainly England had as yet no room for Independency, and the Independents who wished to keep a good conscience were forced to think of seeking a home elsewhere. Certain of their leaders had, indeed, in 1592 organized a church in London, with Francis Johnson as its pastor, and Greenwood as its teacher; but they were so watched and hunted and harassed—fifty-six of its members having been seized at one time and imprisoned—that they resolved, convinced by the fate of Barrowe, Greenwood, and Penry that a peaceable life in England was impossible, to emigrate in a body. Holland was then the common refuge of the distressed for conscience's sake, the place where the outcasts alike of France and Spain and England found a free and even generous home. The Independents, after trying Campden and Naarden, settled finally at Amsterdam. There they completed their church organization, appointing Francis Johnson pastor and Henry Ainsworth teacher.

A much more successful attempt at realizing the Independent ideal was made at Leyden under the leadership of John Robinson. He and his people came from Scrooby, in Nottinghamshire. Their headquarters had been at first at Gainsborough-on-Trent. In 1606 one section of the church under John Smyth—who was to become the most extreme of separatists, discovering that baptism by a corrupt church was none, to rebaptize himself and become founder of the General Baptists—emigrated to Amsterdam; the other organized themselves under Robinson at Scrooby. But peace was impossible; flight became necessary. So in 1607 and 1608 they succeeded in escaping in detachments to Holland, settling first in Amsterdam, ultimately in Leyden. There the fine qualities of Robinson found a congenial soil, and developed as they could not have done in the less generous air of England. Leyden helped to make English separatism into Independency.

The Leyden church is the parent of Independency alike in England and America. In 1616 Henry Jacob, a native of Kent, a graduate of Oxford, one of Johnson's converts, pastor awhile of a church at Middleburg, then a resident with Robinson at Leyden, returned to England, and founded an Independent church at Southwark. In 1620 a little company led by Elder Brewster and Deacon Carver sailed from Delfthaven, landed in the midst of a severe and stormy winter on the North American coast, and there laid the foundations of the New England States, with all they were to be and to create. Jacob had been all through his exile anxiously looking toward England. In 1609 he had addressed to King James "An Humble Supplication for Toleration," in which he begs that "each particular church may be allowed to partake in the benefit of the said toleration, may have, enjoy, and put in execution and practice this her right and privilege," viz., "to elect, ordain, and deprive her own ministers, and to exercise all the other points of lawful ecclesiastical jurisdiction under Christ." This may be regarded as a clear and explicit statement of the early Independent position, its claim for toleration based on its conception of the Christian church, its plea for liberty of worship based on its principle of individualism and the rights of the individual conscience. With what was here asked it would at any time in the seventeenth century have been satisfied, but the Anglican policy of Elizabeth, and James, and Charles I. proceeded on this principle, that to allow diversity was to destroy unity, to permit the growth of elements that would prove fatal to the church, involve the denial of the royal authority and the break-up of the state. Yet the very severity of the Anglican policy strengthened Independency. It helped to identify the struggle for liberty of conscience with the struggle for English liberty.

Up to 1640 little formal progress was made. Churches did not multiply; Laud was too active, and the Star Chamber too vigorous. But the real progress was immense. Statesmen were persuaded that a system which required so harsh a policy could not be right. Religious men who could not conform went to live in lands and under laws where obedience to conscience was possible. There was a double emigration, to the Continent and to New England. In Arnheim, Thomas Goodwin and Philip Nye ministered to a small congregation; in Rotterdam, Hugh Peters and William Ames, the most skilled, scholastic, and disputatious theologian of the early Independents, who came from his professorial chair at Franeker in 1682 to die at Rotterdam a year later. Here, too, when Ames was dead and Peters gone to New England, came Jeremiah Burroughs, William Bridge, and Sidrach Simpson, all of them names that were to be conspicuous and influential in days to come.

But the emigration to New England was much the more important alike as regards its influence on Independency and English history. It has been calculated that in the period 1620–1640 upward of 22,000 Puritan emigrants (the figures have been placed as high as 50,000) sailed from English and Dutch ports. The reasons that compelled their departure determined their quality; they were all men of rigorous consciences, who loved their fatherland much, but religion more, not driven from home by mercantile necessities or ambitions, but solely by their determination to be free to worship God. They were, as Milton said, "faithful and free-born Englishmen and good Christians constrained to forsake their dearest home, their friends, and kindred, whom nothing but the wide ocean and the savage deserts of America could hide and shelter from the fury of the bishops." Men so moved so to act could hardly be commonplace; and so among them we find characters strong and marked, with equal ability to rule and to obey, as Bradford and Brewster, Winslow and Standish, Winthrop and Dr. Samuel Fuller, and men so inflexible in their love of liberty and faith in man as Roger Williams and young Harry Vane. And as were the people so were their ministers. Of these it is enough to name John Cotton, able both as a divine and as a statesman, potent in England by his expositions and apologies of the "New England way," potent in America for his organizing and administrative power; Thomas Hooker, also famed as an exponent and apologist of the "New England way," whose book was commended to theologians at home by Thomas Goodwin, and whose early death was lamented by Cotton in lines which told how

> "Zion's beauty did most clearly shine
> In Hooker's rule and doctrine, both divine;"

John Eliot, famous as the "apostle to the Indians," first of Protestant missionaries to the heathen; Richard Mather, whose influence and work were carried on by his distinguished son, and his still more distinguished grandson, Cotton Mather. The motives and circumstances of the emigrants determined their polity; they went out as churches and settled as church states. They were all Puritans, but not all Independents—indeed, at first only the men from Leyden were, and they were throughout more enlightened and tolerant than the men of the other settlements. Winthrop's company were noncomformists but not separatists, esteemed it "an honor to call the Church of England, from whence we rise, our dear mother," emigrated that they might be divided from her corruptions, not from herself. But the new conditions, backed by the special influence of the Plymouth settlement, were too much for them; they became Independent—first, perhaps, of necessity, then of conviction and choice. Only so could they guard their ecclesiastical and their civil liberties. These, indeed, were at first formally as well as really identical. In 1631 the general court of the Massachusetts colony resolved "that no man shall be admitted to the freedom of this body politic, but such as are members of some of the churches within the limits of the same." Church and state, citizenship in the one and membership in the other, thus became identical, and the foundation was laid for those troubles and consequent severities that vexed and shamed the early history of Independency in New England, natural enough when all their circumstances are fairly considered, indefensible when we regard their idea of the relation of the civil power to the conscience and religion, but explicable when their church idea alone is regarded. And this latter was their own standpoint; their acts were more acts of church discipline than those of civil penalty.

Meanwhile, the growth of the New England States and their Independency in religion exercised extraordinary influence in England. It encouraged the Puritans, opened to them a refuge from the Anglican tyranny, showed them an English state where the bishop had ceased to trouble and where their own principles were active and realized. Laud thoroughly comprehended the situation, saw that Independency in the colonies must be struck down if Anglican policy was to succeed at home. They were a receptacle for schismatics, "from whence, as from the bowels of the Trojan horse, so many incendiaries might break out to inflame the nation;" and so it would be necessary to send them a bishop "for their better government, and back him with some forces to compel, if he were not otherwise able to persuade, obedience." But home politics alone were too much for Laud; and on his downfall and the outbreak of the civil war New England Independency became, on account of its influence on the ecclesiastico-political question, still more potent in English affairs. The Independent party in the Westminster Assembly—which had been called to advise Parliament—was small, but influential. Its ministerial members were Thomas Goodwin, a ponderous but learned and conscientious man; Philip Nye, a skillful debater and adroit man of business; Jeremiah Burroughs, a man of sweet manners and gentle disposition, but great prudence and firmness; William Bridge, and Sidrach Simpson. These were all marked by conspicuous moderation of view, but the lay members, like Lord Saye and Sele and Sir Harry Vane, were more advanced, especially on the cardinal question of toleration. The importance of the New England States was at once recognized by the parliamentary Independents, who made an effort to bring over their three most eminent ministers, John Cotton, John Davenport, and Thomas Hooker. The effort failed; but in place of the men books and pamphlets, expository and defensive of the "New England way," were discharged in quick succession upon the English public. What gave New England its importance was this: it was the first realization on a large scale of the principles of Independency. Here they had been tried under most difficult conditions, and had proved thoroughly successful, capable of maintaining order in the churches, religion in the state, purity of doctrine, and efficiency of discipline. What Geneva had been to the Puritans under Elizabeth New England was now to the Independents—it was their religious ideal realized, their polity commended by an illustrious example. They were no longer, as in the days of John Robinson or Henry Jacob, the apologists of an unpopular and strange theory, hitherto unrealized save on a scale and under conditions that made it ridiculous, charged with all the evils that could be proved logically certain to follow from it. On the contrary, they had now behind them the church-state beyond the ocean, and they could proudly tell how men of English blood, who had fled from the Anglican oppression, had tried Independency and prevailed. So there was the amplest controversy on the points at issue, the Scotch divines being specially active on the one side, and American divines, prefaced and introduced and explained by English, on the other The controversy did something to lessen the distance between Presbyterians and Independents, and did much to strengthen the position of the latter in England. It showed that independence did not mean isolation, that churches that refused to be organized into a political unity still constituted a Christian brotherhood, that societies that were so jealous of their freedom and rights as to deny to every external authority judicial and legislative functions could yet seek and follow fraternal advice, and meet in common councils to advise and be advised. But the Westminister Assembly and the English Parliament did not approve the "New England way," and the Independents had to be contented to plead for toleration. This, indeed, became their great demand—the point on which they and the Presbyterians differed radically. Here the Presbyterians were inflexible. Toleration was to them the very ideal of sin. But to the Independents it was the very condition of continued existence. Without it England would be no better for them under Presbytery than it had been under Episcopacy. As to the nature and degree of toleration, they were divided into two sections, one moderate, the other more advanced. To the former belonged the ministerial members of the assembly, who wished only a limited toleration. They did not desire all views to be tolerated, but only the views of good men, men of pious, tender consciences, not those of infidels or blasphemers. But the more advanced section courageously advocated absolute toleration, denied that so long as a man was a peaceable citizen the magistrate had any right to interfere with his conscience or conscientious beliefs. To this section belonged Harry Vane, Henry Burton, John Goodwin of Coleman Street, ablest and most restless of controversialists in that controversial age; Roger Williams, now a Baptist, but still an Independent, home from America, bringing with him the MS. of a great book on this very subject; finally, above all, John

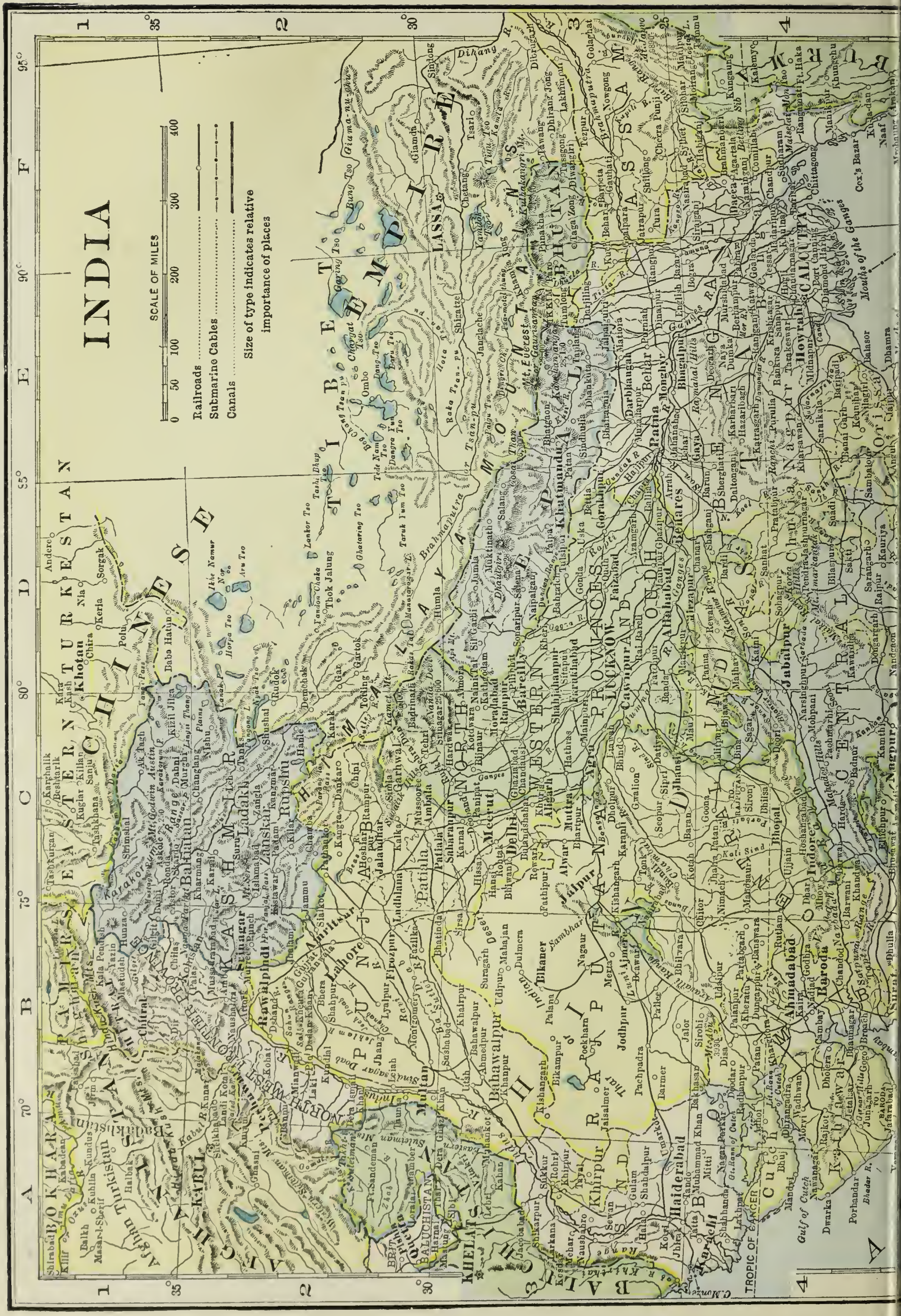
Milton. These were the advanced guard, and theirs was the section that made Independency so immense a political power in the England of the Commonwealth.

The men Independency formed and forced to the front were remarkable men, strong of will, clear of eye, mighty through faith in their principles. And their principles were precisely of the kind suited to the emergency, republican and revolutionary, but steeped in the commanding emotions and enthusiasms of religion. They were principles that ennobled man, that asserted the rights of the individual, and made it an easy matter to deal with the divine rights of kings, or kings too assertive of their rights and forgetful of their duties. So the Independents had the incalculable advantage of always seeing clearly before them, knowing their end and never being in any doubt about the way to it. Besides, their theory of the church fell in with the spirit of the Commonwealth. It made but small distinction between clergy and laity, and the man with the gift of speech could easily exercise it in preaching. So the army when new modeled, formed of men of spirit and conviction, became quite a nursery of Independents, and men like Richard Baxter found that in it there were quite as many ready to edify as wishful to be edified. Religion thus became, not a matter for the clergy, but the possession of the people, not simply the concern of the church, but the business of the whole nation. There was considerable diversity in theological opinion. The moderate men were Calvinists, but among the extreme men were Arminians, like John Goodwin, and men as yet of no recognized school, like John Milton. Independency, in short, meant the equal concern of every man in religion, alike in its deepest mysteries and most practical precepts; and so in a period of religious enthusiasm and ferment it naturally came to the front and took the lead. But the extent of its power under the Commonwealth was the measure of the disfavor that came to it after the Restoration. The Presbyterians had been mainly instrumental in the bringing back of Charles, and so it had been indecent had no attempt been made to comprehend them within the church. But in the case of the Independents there was not even an abortive attempt at comprehension. And they did not ask what they knew they would not receive. They only wished to be tolerated, to be allowed to live, and no more. At first they thought that this might be. Philip Nye had seen the king and was hopeful. But their illusions were soon dispelled. In 1661 the Corporation Act was passed, which disqualified Nonconformists for municipal offices; in 1662 the Act of Uniformity, which drove upward of 2,000 ministers out of the church, and silenced all who did not conform; in 1663 the Conventicle Act, which prevented Nonconformist congregations meeting, not allowing in houses more than five persons beyond the family to be present at once. In 1665 the Five Mile Act forbade nonconforming ministers to come within five miles of any corporate borough; in 1670 the Conventicle Act was made more rigorous; and in 1673 the Test Act made Nonconformists ineligible for offices, civil, naval, or military, under the crown. Charles, who, indeed, in his weak way, tried to be more generous than his church or parliament, wished to tolerate the Nonconformists that he might the better tolerate the Roman Catholics. Out of this feeling came the Declaration of Indulgence in 1672—which was, incidentally, the means of proving the strength of dissent, 3,000 applications being made for licenses to use or erect places of worship; but parliament resisted, and Charles gave way.

In the dark days that had now come to them, the Independents, it may be well said, lived with patient courage, and learned through their sufferings. They had men among them that adorned their adversity, and made even their sudden obscurity illustrious. Their conduct under James showed that they would not purchase their own privileges at the expense of the public safety, and under William their fidelity to the constitution and liberties of England had its first reward in the Act of Toleration. This was but a small concession, and one that by the Occasional Conformity Act of Anne was almost as good as repealed. But what had been done could not be altogether undone. The coming in of the Hanoverian dynasty brought a more liberal spirit into politics, and history has ever since, with an occasional period of declension, been a progressive movement toward freedom. As, one by one, its principles and claims have been admitted by the state, England has become a roomier and healthier place for spirits who feel that for religion to be religious it must be free.

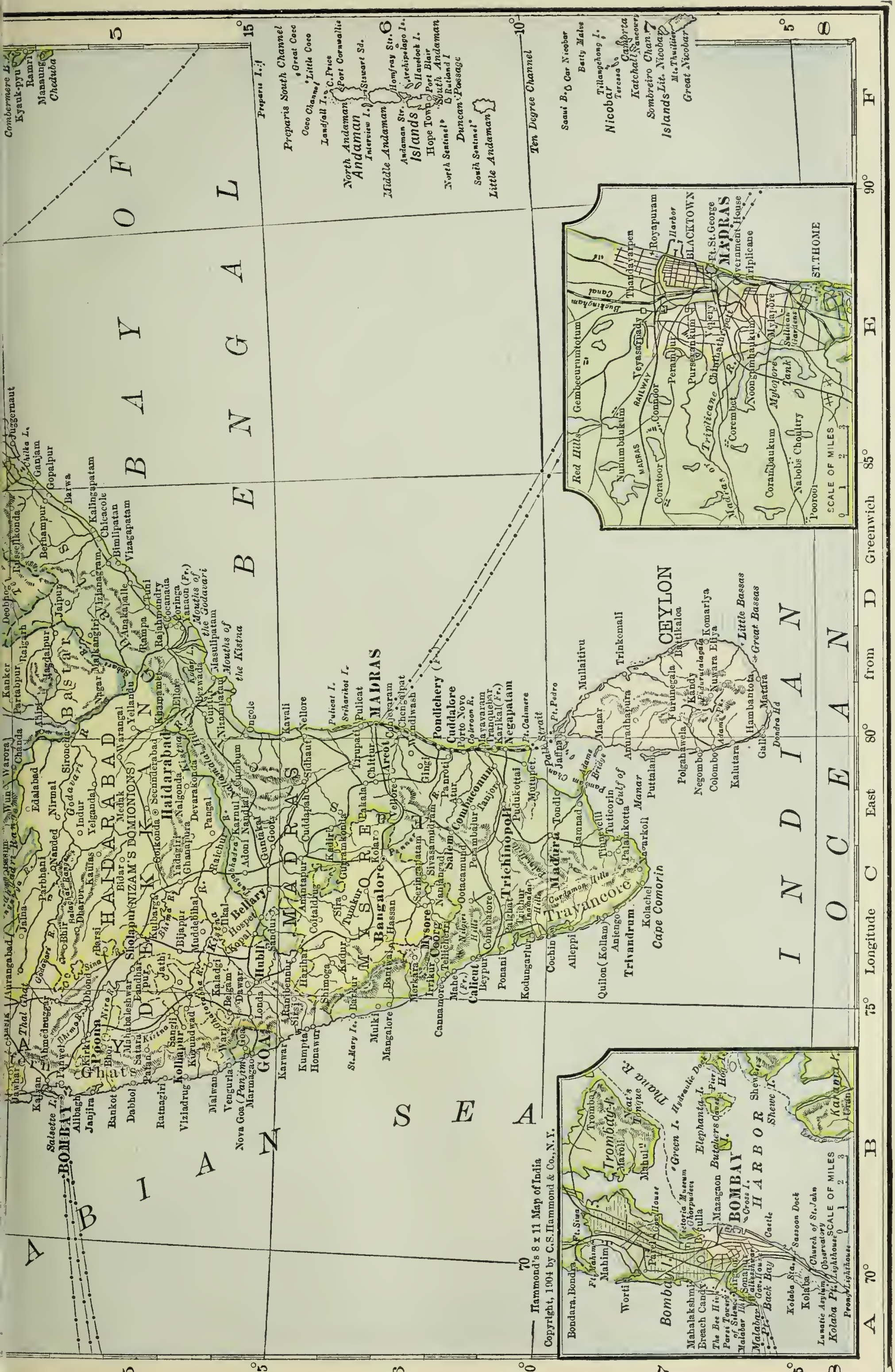
INDEX is a word that may be understood either specially as a table of references to a book or, more generally, as an indicator of the position of required information on any given subject. According to classical usage, the Latin word *index* denoted a discoverer, discloser, or informer; a catalogue or list; an inscription; the title of a book; and the fore or index finger. Cicero also used the word to express the table of contents to a book, and explained his meaning by the Greek form *syllabus.* Shakespeare uses the word with a general meaning of a table of contents or preface. Table was the usual English word, and index was not thoroughly naturalized until the beginning of the seventeenth century, and even then it was usual to explain it as "index or table."

INDEX LIBRORUM PROHIBITORUM is the title borne by the official list of those books which on doctrinal or moral grounds the Roman Catholic Church, under penalty of ecclesiastical censures, authoritatively forbids the members of her communion to possess or to read. Most governments, whether civil or ecclesiastical, have at all times in one way or another acted on the general principle that some control may and ought to be exercised over the literature circulated among those under their jurisdiction. The earliest known instance of a list of proscribed books being issued with the authority of a bishop of Rome is sometimes assigned to the pontificate of Gelasius (494) and sometimes to that of Hormisdas (514), but most probably ought not to be dated earlier than the eighth century. The document is for the most part, as its name implies, a *Notitia Librorum Apocryphorum qui non recipiuntur*, and chiefly consists of an enumeration of such apocryphal works as by their titles might be apt to mislead the unwary into attaching an undue weight to their teaching. Subsequent pontiffs continued to exhort the episcopate and the whole body of the faithful to be on their guard against heretical writings, whether old or new; and one of the functions of the Inquisition when it was established was to exercise a rigid censorship over books put in circulation. The bishops in their dioceses had always, however, a considerable discretion. With the discovery of the art of printing, and the wide and cheap diffusion of all sorts of books which ensued, the need for new precautions against heresy and immorality in literature made itself felt, and more than one pope gave special direction to the archbishops of Cologne, Mainz, Treves, and Magdeburg regarding the growing abuses of the printing press; in 1515 the Lateran council formulated the decree *de Impressione Librorum*, which required that no work should be printed without previous examination by the proper ecclesiastical authority, the penalty of unlicensed printing being excommunication of the culprit, and confiscation and destruction of the books. The council of Trent in its fourth session, April 8, 1546, forbade the



INDIA

SCALE OF MILES
0 50 100 200 300 400
Railroads
Submarine Cables
Canals
Size of type indicates relative importance of places
A B C D E F
1 2 3 4
70° 75° 80° 85° 90° 95°
35° 30°
TROPIC OF CANCER
EASTERN TURKESTAN
CHINESE EMPIRE
TIBET
BOKHARA
AFGHANISTAN
Afghan Turkistan
Badakhshan
BALUCHISTAN
KHELAT
KASHMIR
PUNJAB
RAJPUTANA
NORTH WESTERN PROVINCES
OUDH
CENTRAL INDIA
CENTRAL PROVINCES
BENGAL
ASSAM
NEPAL
BHUTAN
SIND
Cutch
Kathiawar
HIMALAYA MOUNTAINS
Kabul
Quetta
Multan
Lahore
Amritsur
Srinagar
Rawalpindi
Peshawar
Delhi
Meerut
Bareilly
Lucknow
Cawnpur
Allahabad
Benares
Patna
Calcutta
Howrah
Khatmandu
Lassa
Mt. Everest
Darjiling
Agra
Jaipur
Ajmere
Jodhpur
Bikaner
Bahawalpur
Haiderabad
Karachi
Ahmadabad
Baroda
Surat
Indore
Bhopal
Jabalpur
Nagpur
Gwalior
Jhansi
Khotan
Brahmaputra R.
Ganges R.
Indus R.
Mouths of the Ganges
Gulf of Cutch
C. Monze



Hammond's 8 x 11 Map of India
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sale or possession of any anonymous religious book which had not previously been seen and approved by the ordinary; in the same year the university of Louvain, at the command of Charles V., prepared an *Index* of pernicious and forbidden books, a second edition of which appeared in 1550.

In 1557, and again in 1559, Pope Paul IV., through the Inquisition at Rome, published what may be regarded as the first Roman *Index* in the modern ecclesiastical use of that term. All anonymous works published since 1519 were condemned without exception in this *Index*, which directed its hostility chiefly against works that seemed unfavorable to the claims of the Roman curia, or maintained the superiority of councils over popes. A list of sixty-two printers of heretical books was appended. At the eighteenth session of the council of Trent (February 26, 1562), in consideration of the great increase in the number of suspect and pernicious books, and also of the inefficacy of the many previous "censures" which had proceeded from the provinces and from Rome itself, certain fathers were appointed to inquire into these "censures," and to consider what ought to be done in the circumstances. At the twenty-fifth session (December 4, 1563) this committee of the council was reported to have completed its work, but as the subject did not seem (on account of the great number and variety of the books) to admit of being properly discussed by the council, the result of its labors was handed over to the pope (Pius IV.) to deal with as he should think proper. In the following March accordingly were published, with papal approval, the *Index librorum prohibitorum*, which continues to be reprinted and brought down to date, and the "Ten Rules" which, supplemented and explained by Clement VIII., Sixtus V., Alexander VII., and finally by Benedict XIV. (July 10, 1753), still regulate the preparation of that catalogue. By the first of these rules the condemnation of all books already condemned by pope or council prior to 1515 is renewed; by the second the works of "heresiarchs" (Luther, Zwingli, Calvin, Schwenkfeld, Hübmaier) are condemned whatever be their subject, but it is provided that the non-religious works of those who are heretics merely may on examination and approval be permitted; the third and fourth relate to translations of the Bible; the fifth orders the expurgation of lexicons, concordances, and similar compilations by heretics; the sixth discourages the circulation of books in the vulgar tongue about controversies between Catholics and heretics; the seventh, eighth, and ninth relate to obscene or grossly superstitious publications; the tenth contains various details of procedure about the licensing of books, and concludes with the declaration that the possessor or reader of heretical books is forthwith to be excommunicated, while the possessor or reader of books prohibited on other grounds falls into mortal sin, and is to be dealt with severely at the discretion of the bishop. The business of correcting the *Index* to date is now in the hands of an ecclesiastical board known as the "Congregation of the Index," which consists of a prefect (who is always a cardinal) and other cardinals, with whom are associated the "consulters" and "examiners of books." The *Index Librorum Expurgandorum* or *Expurgatorius* catalogues the works which may be read after the deletion of specified passages. Bishops have the power of granting at their discretion the right to read forbidden books, except in some reserved cases, where the papal dispensation is required. The Roman Index is unfortunately very far from being an exhaustive catalogue of works inconsistent with Catholic orthodoxy, and thus lacks the interest and vast importance it would otherwise have had for the bibliographer

The early Reformers, by their attitude toward writings which from their point of view seemed objectionable, furnished many an *argumentum ad hominem* to the Catholics; thus we find Calvin writing to the ministers at Frankfort about one of the books of Servetus, with a view to its being burnt. Gradually, however, all the Protestant churches have recognized the expediency of leaving individuals and communities practically free to select for their instruction and amusement the works which in the conscientious exercise of their own responsible judgment they may find best adapted to their wants.

INDIA is a great empire of Asia, composed of nine provinces under direct British administration, and about 151 feudatory states and principalities, which equally with the British provinces acknowledge the paramount sovereignty of the British crown. The whole empire contains (1901) 1,559,603 square miles, and 294,261,701 inhabitants. The area, therefore, is almost equal to, and the population is just about equal to, the area and population of all Europe, less Russia. The people number more than Gibbon's estimate of 120,000,000 for all the races and nations which obeyed Imperial Rome.

The natives of India can scarcely be said to have a word of their own by which to express their common country. In Sanskrit, it would be called "Bhárata-varsha," from Bharata, a legendary monarch of the Lunar line; but Sanskrit is no more the vernacular of India than Latin is of Europe. The name "Hindustán," which was at one time adopted by European geographers, is of Persian origin, meaning "the land of the Hindus," as Afghánistán means "the land of Afgháns." According to native usage, however, "Hindustán" is limited either to that portion of the peninsula lying north of the Vindyá mountains, or yet more strictly to the upper basin of the Ganges where Hindí is the spoken language. The "East Indies," as opposed to the "West Indies," is an old-fashioned and inaccurate phrase, dating from the dawn of maritime discovery, and still lingering in certain parliamentary papers. "India," the abstract form of a word derived through the Greeks from the Persicized form of the Sanskrit *sindhu*, a "river," preëminently the Indus, has become familiar since the British acquired the country, and is now officially recognized in the imperial title of the sovereign.

India, as thus defined, is the middle of the three irregularly shaped peninsulas which jut out southward from the mainland of Asia, thus corresponding roughly to the peninsula of Italy in the map of Europe. Its form is that of a great triangle, with its base resting upon the Himálayan range, and its apex running far into the ocean. The chief part of its western side is washed by the Arabian Sea, and the chief part of its eastern side by the Bay of Bengal. It extends from the eighth to the thirty-fifth degree of north latitude, that is to say, from the hottest regions of the equator to far within the temperate zone. The capital, Calcutta, lies in 88° E. longitude; so that when the sun sets at six o'clock there, it is just past mid-day in England, and early morning in New York. The length of India from north to south, and its greatest breadth from east to west, are both about 1,900 miles; but the triangle tapers with a pear-shaped curve to a point at Cape Comorin, its southern extremity. To this compact dominion the English have added, under the name of British Burmah, the strip of country on the eastern shores of the Bay of Bengal. But on the other hand, the adjacent island of Ceylon has been artificially severed, and placed under the colonial office. Two groups of islands in the Bay of Bengal, the Andamans and the Nicobars; one group in the Arabian Sea, the Laccadives; and the outlying station of Aden at the mouth of the Red Sea, are all politically included with the Indian empire; while dots on the shore of the peninsula itself, representing Portuguese and French settlements, break at intervals the continuous line of British territory.

India is shut off from the rest of Asia on the north by a vast mountainous region, known in the aggregate as the Himálayas, amid which lie the independent states of Bhután and Nepál, with the great table-land of Tibet behind. The native principality of Kashmír occupies the northwestern angle of India, with Eastern Turkestán stretching to the north beyond it. At this northwestern angle the mountains curve southward, and India is separated by the well-marked ranges of the Sufed Koh and Suláimán from Afghánistán; and by a southern continuation of lower hills (the Hálas, etc.) from Baluchistán. The last part of the western land frontier of India is formed by the river Hab, and the boundary ends at Cape Monze, at the mouth of its estuary. Still farther southward India is bounded along the west and southwest by the Arabian Sea and the Indian Ocean. Turning northward from the southern extremity at Cape Comorin, the long sea-line of the Bay of Bengal forms the main part of its eastern boundary. But on the northeast, as on the northwest, India has again a land frontier. The Himálayan ranges at the northeastern angle throw off spurs and chains to the southeast. These spurs, which have been but imperfectly explored, and may possibly constitute an independent mountain system, separate the British provinces of Assam and Eastern Bengal from Independent Burmah. Up to this point, the eastern frontier follows, generally speaking, the watershed which divides the river systems of the Brahmaputra, Meghna, Kuladan (Koladyne), etc., in Bengal and British Burmah, from the Irawadi basin in Independent Burmah. But from near the base of the Myeng-mateng Mountain, the British frontier stretches almost due east, in an artificial line which divides the lower districts and delta of the Irawadi in British Burmah from the middle and upper districts of that river in Independent Burmah. Stretching southeastward from the delta of the Irawadi, a confused succession of little-explored ranges separates the British province of Tenasserim from the native kingdom of Siam. The boundary line runs down to Point Victoria at the extremity of Tenassarim, following in a somewhat rough manner the watershed between the rivers of the British territory on the west and of Siam on the east.

The empire included within these boundaries is rich in varieties of scenery and climate, from the highest mountains in the world to vast river deltas raised only a few inches above the level of the sea. It forms a continent rather than a country. But if we could look down on the whole from a balloon, we should find that India consists of three separate and well-defined tracts. The first includes the lofty Himálaya mountains, which shut it out from the rest of Asia; and which, although for the most part beyond the British frontier, form an overruling factor in the physical geography of northern India. The second region stretches southward from the base of the Himálayas, and comprises the plains of the great rivers which issue from them. The third region slopes upward again from the edge of the river plains, and consists of a high three-sided table-land, supported by the Vindhyá mountains on the north, and by the Eastern and Western Ghâts, which run down the coast on either side till they meet at a point near Cape Comorin. The interior three-sided table-land thus inclosed is broken by peaks and ranges, interspersed with broad expanses of level uplands, and covers the whole southern half of the peninsula.

The first of the three regions is the Himálaya mountains and their offshoots to the southward. The Himálayas—literally, the "Dwelling-place of Snow," from the Sanskrit *hima*, frost (Latin, *hiems*, winter), and *álaya*, a house—comprise a system of stupendous ranges, the loftiest in the world. They are the *Emodus* of Ptolemy (among other names), and extend in the shape of a scimitar, with its edge facing southward, for a distance of 1,500 miles along the northern frontier of India. At the northeastern angle of that frontier, the Dihang river, the connecting link between the Tsanpu (Sangpu) of Tibet and the Brahmaputra of Assam, bursts through the main axis of the range. At the opposite or northwestern angle, the Indus in like manner pierces the Himálayas, and turns southward on its course through the Punjab. The Himálayan region has been fully described in a separate article.

This wild region is in many parts impenetrable to man, and nowhere yields a passage for a modern army. It should be mentioned, however, that the Chinese outposts extend as far as a point only 6,000 feet above the Gangetic plain, north of Khatmandu. Indeed, Chinese armies have seriously threatened Khatmandu itself; and Sir David Ochterlony's advance from the plains of Bengal to that city in 1816 is a matter of history. Ancient and well-known trade routes exist, by means of which merchandise from the Punjab finds its way over heights of 18,000 feet into Eastern Turkestán and Tibet. The Muztagh (Snowy Mountain), the Karakoram (Black Mountain), and the Changchenmo are the most famous of these passes.

The Himálayas not only form a double wall along the north of India, but at both their eastern and western extremities send out ranges to the south, which protect its northeastern and northwestern frontiers. On the northeast, those offshoots, under the name of the Nágá and Patkoi mountains, etc., form a barrier between the civilized British districts and the wild tribes of Upper Burmah. The southern continuations of these ranges, known as the Yomas, separate British from Independent Burmah, and are crossed by passes, the most historic of which, the Aeng or An, rises to 4,668 (formerly given at 4,517) feet, with gradients of 472 feet to the mile.

On the opposite or northwestern frontier of India, the mountainous offshoots run down the entire length of the British boundaries from the Himálayas to the sea. As they proceed southward, their best marked ranges are in turn known as the Sufed Koh, the Suláimán, and the Hála mountains.

The wide plains watered by the Himálayan rivers form the second of the three regions into which we have divided India. They extend from the Bay of Bengal on the east to the Afghán frontier and Arabian Sea on the west, and contain the richest and most densely crowded provinces of the empire. One set of invaders after another has from prehistoric times entered by the passes at their eastern and northwestern frontiers. They followed the courses of the rivers, and pushed the earlier comers southward before them toward the sea. About 150,000,000 of people now live on and around these river plains, in the provinces known as the lieutenant-governorship of Bengal, Assam, the Northwestern Provinces and Oudh, the Punjab, Sind, Rájputána, and other native states.

The vast level tract which thus covers northern India is watered by three distinct river systems. One of these systems takes its rise in the hollow trough beyond the Himálayas, and issues through their western ranges upon the Punjab as the Sutlej and Indus. The second of the three river systems also takes its rise beyond the double wall of the Himálayas, not very far from the sources of the Indus and the Sutlej. It turns, however, almost due east instead of west, enters India at the eastern extremity of the Himálayas, and becomes the Brahmaputra of Assam and Eastern Bengal. These rivers collect the drainage of the northern slopes of the Himálayas, and convey it, by long and tortuous although opposite routes, into India. Indeed, the special feature of the Himálayas is that they send down the rainfall from their northern as well as from their southern slopes to the Indian plains. Of three great rivers of northern India, the two longest, namely, the Indus with its feeder the Sutlej and the Brahmaputra, take their rise in the trough on the north of the Himálayas. The third river system of northern India receives the drainage of their southern slopes, and eventually unites into the mighty stream of the Ganges. In this way the rainfall, alike from the northern and southern slopes of the Himálayas, pours down into the river plains of Bengal.

Throughout the river plains of northern India, two harvests, and in some provinces three, are reaped each year. These crops are not necessarily taken from the same land; but in many districts the best fields have to yield two harvests within the twelve months. In Lower Bengal, peas, pulses, oil-seeds, and green crops of various sorts are reaped in spring; the early rice crops in September; the great rice harvest of the year, and other grains, in November and December. Before these last have been gathered in, it is time to prepare the ground for the spring crops, and the Bengal husbandman knows no rest except during the hot weeks of May, when he is anxiously waiting for the rains. But it should always be remembered that rice is the staple crop in only a limited area of India, and that it forms the everyday food of only a comparatively small proportion of the population. It has been estimated that, in the absence of irrigation, the rice crop requires an annual rainfall of at least thirty-six inches; and an Indian province requires an average fall of not less than fifty or sixty inches in order to grow rice as its staple crop. A line might almost be drawn across Behar, to the north of which the food of the people ceases to be rice and becomes wheat and millets, etc. There are, indeed, great rice-growing tracts in irrigated or low-lying districts of northwestern India, but their produce is consumed by the richer classes or exported.

In the northern and drier regions along the upper courses of the rivers, the country rises gently from their channels in fertile undulations, dotted with mud villages and adorned with noble trees. Mango groves scent the air with their blossom in spring, and yield their abundant fruit in summer. The spreading banyan, with its colonnades of hanging roots; the stately *pipal*, with its green masses of foliage; the leafless wild cotton-tree, glowing with heavy crimson flowers; the tall, feathery tamarind, and the quick-growing *bábul*, rear their heads above the fields. As the rivers approach the coast, the palms begin to take possession of the scene. The ordinary landscape in the delta is a flat stretch of rice fields, fringed around with evergreen masses of bamboos, cocoanuts, date-trees, areca, and other coroneted palms. This densely peopled tract seems at first sight bare of villages, for each hamlet is hidden away amid its own grove of plantains and wealth-giving trees. The bamboo and cocoanut play a conspicuous part in the industrial life of the people; and the number of products derived from them, including rope, oil, food, and timber, has been dwelt on with admiration by many writers.

The crops also change as we sail down the rivers. In the north, the principal grains are wheat, barley, Indian corn, and a variety of millets, such as *joár* (*Holcus Sorghum*) and *bájra* (*Holcus spicatus*). In the delta, on the other hand, rice is the staple crop and the universal diet. In a single district, Rangpur, 295 separate kinds of rice are known to the peasant, who has learned to grow his favorite crop in every locality, from the solid field, which yields the *áman* harvest, to the swamps twelve feet deep, on the surface of whose waters the rice ears may be seen struggling upward for air. Sugar-cane, oil-seeds, flax, mustard, sesamum, palma-christi, cotton, tobacco, indigo, safflower, turmeric, ginger, coriander, capsicum, cummin, and many precious spices and dyes are grown both in the Northwestern or Upper Provinces, and in the moister valleys and delta of Lower Bengal. A whole pharmacopœia of native medicines, from the well-known aloe and castor-oil to obscure but valuable febrifuges, is derived from shrubs, herbs, and roots. Resins, gums, varnishes, scents, and a hundred articles of commerce or luxury are collected in the fields or forests. Vegetables of many sorts, both indigenous and imported from Europe, form a large part of the food of the people. The melon and huge yellow pumpkin spread themselves over the thatched roofs; fields of potatoes, yams, and *brinjal* are attached to the homesteads. The tea-plant is reared on the hilly ranges that skirt the plains both in the northwest and in Assam; the opium poppy about half down the Ganges, around Benares and Patná; the silkworm mulberry still farther down in Lower Bengal; while the jute fiber is essentially a crop of the delta, and would exhaust any soil not fertilized by river floods. Even the jungles yield the costly lac dye and *tasar* silk cocoons. The *mahuá*, also a product of the jungle, produces the fleshy flowers which form a staple article of food among the hill tribes, and when distilled supply a cheap spirit. The *sál*, *sissu*, *tún*, and many other indigenous trees yield excellent timber. Flowering creepers, of gigantic size and gorgeous colors, festoon the jungle; while each tank bears its own beautiful crop of the lotus and water-lilies. Nearly every vegetable product that feeds and clothes a people, or enables it to trade with foreign countries, abounds.

We come now to the third division of India, namely, the three-sided table-land which covers the southern half or more strictly peninsular portion of India. This tract, known in ancient times as the Deccan, literally "the right hand or south," comprises the Central Provinces, Berar, Madras, Bombay, and the native territories of the Nizám, Sindhia, Holkar, with Mysore and other feudatory states. It had in 1872 an aggregate population of over 90,000,000. For the sake of easy remembrance, therefore, we may take the inhabitants of the river plains in the north to be now nearly 150,000,000, and those of the southern three-sided table-land at 115,000,000. The Deccan, in its local acceptation, is restricted to the high tract between the Narbadá (Nerbudda) and the Kistná rivers; but it is popularly understood to include the whole country south of the Vindhyás as far as Cape Comorin. It slopes up from the southern edge of the Gangetic plains. Three ranges of hills support its northern, its eastern, and its western sides; and the last two meet at a sharp angle near Cape Comorin.

The northern side rests on confused ranges, running with a general direction of east to west, and known in the aggregate as the Vindhyá mountains. The Vindhyás, however, are made up of several distinct hill systems. Two sacred peaks guard the flanks in the extreme east and west, with a succession of ranges stretching 800 miles between. At the western extremity, Mount Abu, famous for its exquisite Jain temples, rises, as a solitary outpost of the Aravalli hills, 5,650 feet above the Rájputána plain, like an island out of the sea. Beyond the southern limits of that plain, the Vindhyá range of modern geography runs almost due east from Guzerat, forming the northern wall of the Narbadá valley. The Sátpura mountains stretch also east and west to the south of that river, and form the watershed between it and Tápti. Toward the heart of India the eastern extremities of these two converge in the highlands of the Central Provinces and their lofty level plains. Passing still farther east, the hill system finds a continuation in the Káimur range and its congeners, which eventually end in the outlying peaks and spurs that form the western boundary of Lower Bengal, and abut on the old course of the Ganges under the name of the Rájmahál hills. On the extreme east, Mount Párasnáth—like Mount Abu on the extreme west, sacred to Jain rites—rises to 4,400 feet above the level of the Gangetic plains. The various ranges of the Vindhyás, from 1,500 to over 4,000 feet high, form, as it were, the northern wall and buttresses which support the central table-land. Though now pierced by road and railway, they stood in former times as a barrier of mountain and jungle between northern and southern India, and formed one of the main obstructions to welding the whole into an empire. They consist of vast masses of forests, ridges, and peaks, broken by cultivated valleys and broad high-lying plains.

The other two sides of the elevated southern triangle are known as the Eastern and Western Gháts. These start southward from the eastern and western extremities of the Vindhyá system, and run along the eastern and western coasts of India. The Eastern Gháts stretch in fragmentary spurs and ranges down the Madras Presidency, here and there receding inland and leaving broad level tracts between their base and the coast. The Western Gháts form the great sea-wall of the Bombay presidency, with only a narrow strip between them and the shore. In many parts they rise in magnificent precipices and headlands out of the ocean, and truly look like colossal "passes or landing-stairs" (*gháts*) from the sea.

The physical geography and the political destiny of the two sides of the Indian peninsula have been determined by the characteristics of the mountain ranges on either coast. On the east, the country is comparatively open, and was everywhere accessible to the spread of civilization. On the east, therefore, the ancient dynasties of southern India fixed their capitals. Along the west, only a narrow strip of lowland intervenes between the barrier range and the seaboard. The inhabitants of those tracts remained apart from the civilization of the eastern coast. To this day one of their ruling races, the Nairs, retain land-tenures and social customs, such as polyandry, which mark a much ruder stage of human advancement than Hinduism, and in other parts of India only linger among isolated hill tribes. On the other hand, the people of the western coast enjoy a bountiful rainfall, unknown in the inner plateau and the east. The monsoon dashes its rain-laden clouds against the Western Gháts, and pours from 100 to 250 inches of rain upon their maritime slopes from Khándesh down to Malabar. By the time that the monsoon has crossed the Western Gháts, it has dropped the greater part of its aqueous burden, and central districts, such as Bangalore, obtain only about thirty-five inches. The eastern coast also receives a monsoon of its own; but, except in the neighborhood of the sea, the rainfall throughout the Madras presidency is scanty, seldom exceeding forty inches in the year. The deltas of the three great rivers along the Madras coast form, of course, tracts of inexhaustible fertility; and much is done by irrigation on the thirsty inland plateau to husband and utilize both the local rainfall and the accumulated waters which the rivers bring down.

Of the three regions of India, now briefly surveyed, the first, or the Himálayas, lies for the most part beyond the British frontier, but a knowledge of it supplies the key to the ethnology and history of India. The second region, or the great river plains in the north, formed the theater of the ancient race-movements which shaped the civilization and the political destinies of the whole Indian peninsula. The third region, or the triangular table-land in the south, has a character quite distinct from either of the other two divisions, and a population which is now working out a separate development of its own. Broadly speaking, the Himálayas are peopled by Turanian tribes; the great river plains of Hindustán are still the home of the Aryan race; the triangular table-land has formed an arena for a long struggle between that gifted race from the north and what is known as the Dravidian stock in the south.

To this vast empire the English have now added all Burmah, consisting of the entire valley of the Irawadi (Irrawaddy) with its delta, and a long, flat strip stretching down the eastern side of the Bay of Bengal. Between the narrow maritime tract and the Irawadi runs a backbone of lofty ranges. These ranges, known as the Yoma (Roma) mountains, are covered with dense forests, and both historically and geographically separate the Irawadi valley from the strip of coast. The Yoma (Roma) ranges have peaks exceeding 4,000 feet, and culminate in the Blue Mountain (7,100 feet). They are crossed by passes, one of which, the An or Aeng, rises to 4,668 feet above the sea-level. A thousand creeks indent the seaboard; and the whole of the level country, both on the coast and in the Irawadi valley, forms one vast rice-field. The river floats down an abundant supply of teak and bamboos from the north. Tobacco, of an excellent quality, supplies the little cigars which all Burmese (men, women and children) smoke. Arakan and Pegu, or the provinces of the coast strip and the Irawadi valley, contain mineral oil-springs. Tenasserim forms a long, narrow maritime province, which runs from the mouths of the Irawadi southward to Point Victoria, where the British territory adjoins Siam. It is rich in tin mines, and contains iron ores equal to the finest Swedish, besides gold and copper in smaller quantities, and a very pure limestone. Rice and timber form the staple exports of Burmah; and rice is also the universal food of the people. Burmah, since the acquisition of the native territory in 1901, contains a total area of 231,211 square miles, and a population of at least 10,500,000.

Unlike many other large geographical areas, India is remarkable for having no distinctive botanical features peculiar to itself. It differs conspicuously in this respect from such countries as Australia or South Africa. Its vegetation is in point of fact of a composite character, and is constituted by the meeting and more or less blending of adjoining floras—of those of Persia and the southeastern Mediterranean area to the northwest, of Siberia to the north, of China to the east, and of Malaya to the southeast.

First among the wild animals of India must be mentioned the lion, which is known to have been not uncommon within historical times in Hindustán Proper, and the Punjab. At present, the lion is supposed to be confined to the sandy deserts of Guzerat. A peculiar variety is there found, marked by the absence of a mane; but whether this variety deserves to be classed as a distinct species naturalists are not yet determined. The former extent of the lion's range, or at least the degree to which its presence impressed the imagination, may be inferred from the common personal names, Sinh or Sing, Sher, and Hyder, which all signify "lion." The characteristic beast of prey in India is the tiger, which is found in every part of the country from the slopes of the Himálayas to the Sundarban swamps. Sir Joseph Fayrer, the highest living authority on this subject, believes that twelve feet is the maximum length of the tiger, when measured from nose to tip of tail immediately after death. The advance of cultivation, even more than the incessant attacks of sportsmen, has gradually caused the tiger to become a rare animal in large tracts of country; but it is scarcely probable that he will ever be exterminated from India. His favorite food appears to be deer, antelope, and wild hog. When these abound he will disregard domestic cattle. Indeed, the natives are disposed to consider him as in some sort their protector, as he saves their crops from destruction by the wild animals on which he feeds. But when once he develops a taste for human blood, then the slaughter he works becomes truly formidable. The confirmed man-eater, which is generally an old beast, disabled from overtaking his usual prey, seems to accumulate his tale of victims in sheer cruelty rather than for food. A single tiger is known to have killed 108 people in the course of three years. Another killed an average of about eighty persons per annum. A third caused thirteen villages to be abandoned, and 250 square miles of land to be thrown out of cultivation. A fourth, so late as 1869, killed 127 people, and stopped a public road for many weeks, until the opportune arrival of an English sportsman, who at last killed him. Such cases are, of course, exceptional, and generally refer to a period long past, but they explain and justify the superstitious awe with which the tiger is regarded by the natives. The favorite mode of shooting the tiger is from the back of elephants, or from elevated platforms (*machháns*) of boughs in the jungle. In Central India they are shot on foot. In Assam they are sometimes speared from boats, and in the Himálayas they are said to be ensnared by birdlime. Rewards are given by government to native *shikáris* for the heads of tigers, varying in time and place according to the need. In 1877, 819 persons and 16,137 cattle were reported to have been killed by tigers; on the other side of the account, 1,579 tigers were reported slain, and £3,777 was paid in rewards. The leopard or panther is far more common than the tiger in all parts of India, and at least equally destructive to life and property. The greatest length of the leopard is about seven feet six inches. A black variety, as beautiful as it is rare, is sometimes found in the extreme south of the peninsula, and also in Java. The cheetah or hunting leopard (*Gueparda jubata*) must be carefully distinguished from the leopard proper. This animal appears to be a native only of the Deccan, where it is trained for hunting the antelope. In some respects it approaches the dog more nearly than the cat tribe. Its limbs are long, its hair rough, and its claws blunt and only partially retractile. The speed with which it bounds upon its prey, when loosed from the cart, exceeds the swiftness of any other mammal. If it misses its first attack, it scarcely ever attempts to follow, but returns to its master.

Wolves abound throughout the open country, but are rare in the wooded districts. Their favorite prey is sheep, but they are also said to run down antelopes and hares, or rather catch them by lying in ambush. Instances of their attacking man are not uncommon. In 1827 upward of thirty children were carried off by wolves in a single *parganá;* and the story of Romulus and Remus has had its counterpart in India within recent times. The Indian wolf has a dingy, reddish-white fur, some of the hairs being tipped with black. By some naturalists it is regarded as a distinct species, under the name of *Canis pallipes.* Three distinct varieties, the white, the red, and the black wolf are found in the Tibetan Himálayas. The Indian fox is comparatively rare, but the jackal abounds everywhere, making night hideous by its never-to-be-forgotten yells. The jackal and not the fox is usually the animal hunted by the packs of hounds occasionally kept by Europeans. The wild dog or dhole is found in all the wilder jungles of India, including Assam and British Burmah. Its characteristic is that it hunts in packs, sometimes containing thirty dogs, and does not give tongue. When once a pack of wild dogs has put up any animal, whether deer or tiger, that animal's doom is sealed. They do not leave it for days, and finally bring it to bay or run it down exhausted. These wild dogs have sometimes been half domesticated, and trained to hunt for the use of man. A peculiar variety of wild dog exists in the Karen hills of Burmah, thus described from a specimen in confinement. It was black and white, as hairy as a Skye terrier, and as large as a medium-sized spaniel. It had an invariable habit of digging a hole in the ground, into which it crawled backward, remaining there all day with only its nose and ferrety eyes visible. Among other dogs of India are the pariah, which is merely a mongrel run wild and half starved; the poligar dog, an immense creature peculiar to the south; the greyhound, used for coursing; and the mastiff of Tibet and Bhután. The striped hyena is common, being found wherever the wolf is absent. Like the wolf, it is very destructive both to the flocks and to children.

Of bears, the common black or sloth bear is common throughout India, wherever rocky hills and forests occur. It is distinguished by a white horseshoe mark on its breast. Its food consists of ants, honey and fruit. When disturbed it will attack man, and it is a dangerous antagonist, for it always strikes at the face. The Himálayan or Tibetan sun bear is found along the north from the Punjab to Assam. During the summer it remains high up in the mountains, near the limit of snow, but in the winter it descends to 5,000 feet and even lower. Its congener, the Malayan sun bear, is found in British Burmah, where also there is a smaller species, and a very large animal reported to be as big as the American grizzly.

The elephant is found in many parts of India, though not in the northwest. Contrary to what might be anticipated from its size and from the habits of its African cousin, the Indian elephant is now, at any rate, an inhabitant, not of the plains, but of the hills; and even on the hills it is usually found among the higher ridges and plateaus, and not in the valleys. From the peninsula of India the elephant has been gradually exterminated, being only found now in the primeval forests of Coorg, Mysore, and Travancore, and in the tributary states of Orissa. It still exists in considerable number along the *tarái* or submontane fringe of the Himálayas. The main source of supply at the present time is the confused mass of hills which forms the northeast boundary of British India, from Assam to Burmah. Two varieties are there distinguished, the *gunda* or tusker, and the *makna* or *hine*, which has no tusks. The reports of the height of the elephant, like those of its intelligence, seem to be exaggerated. The maximum is probably twelve feet. If hunted, the elephant must be attacked on foot, and the sport is therefore dangerous, especially as the animal has but few parts vulnerable to a bullet. The regular mode of catching elephants is by means of a *kheda* or gigantic stockade, into which a wild herd is driven, then starved into submission, and tamed by animals already domesticated. The practice of capturing them in pitfalls is discouraged as cruel and wasteful. Elephants now form a government monopoly everywhere in India. The shooting of them is prohibited, except when they become dangerous to man or destructive to the crops; and the right of capturing them is only leased out upon conditions. A special law, under the title of "The Elephants Preservation Act" (No. VI. of 1879), regulates this licensing system. Whoever kills, captures, or injures an elephant, or attempts to do so, without a license, is punishable by a fine of 500 rupees for the first offense; and a similar fine, together with six months' imprisonment, for a second offense. In the year 1877–78 a total of 264 elephants were captured in the province of Assam, yielding to government a revenue of £3,600. Though the supply is decreasing, elephants continue to be in great demand. Their chief use is in the timber trade, and for government transport. They are also bought up by native chiefs at high prices for purposes of ostentation. Of the rhinoceros, four distinct varieties are enumerated, two with a single and two with a double horn. The most familiar is the *Rhinoceros unicornis*, commonly found in the Brahmaputra valley and in the Sundarbans. It has but one horn, and is covered with massive folds of naked skin. It sometimes attains a height of six feet; its horn, which is much prized by the natives for medicinal purposes, seldom exceeds fourteen inches in length. It frequents swampy, shady spots, and wallows in mud like a pig. The inveterate antipathy of the rhinoceros to the elephant seems to be mythical. The Javan rhinocerous is found in the same localities. It also has but one horn, and mainly differs from the foregoing in being smaller, and having less prominent "shields." The Sumatran rhinoceros is found from Chittagong southward through Burmah. It has two horns and a bristly coat. The hairy-eared rhinoceros is only known from a specimen captured at Chittagong.

The wild hog is well known as affording the most exciting sport in the world—"pig-sticking." It frequents cultivated situations, and is the most mischievous enemy of the villager. A rare animal, called the pigmy hog, exists in the *tarái* of Nepál and Sikkim, and has been shot in Assam. Its height is only ten inches, and its weight does not exceed twelve pounds.

The wild ass is confined to the sandy deserts of Sind and Kachhch (Cutch), where, from its speed and timidity, it is almost unapproachable.

Many wild species of the sheep and goat tribe are to be found in the Himálayan ranges.

The antelope tribe is represented by comparatively few species, as compared with the great number peculiar to Africa.

The king of the deer tribe is the *sámbhar*, or *gerau*, erroneously called "elk" by sportsmen. It is found on the forest-clad hills in all parts of the country. It is of a deep-brown color, with hair on its neck almost like a mane; and it stands nearly five feet high, with spreading antlers nearly three feet in length. Next in size is the swamp deer or *bara-singha*, signifying "twelve points," which is common in Lower Bengal and Assam. The *chitál* or spotted deer is generally admitted to be the most beautiful inhabitant of the Indian jungles.

The ox tribe is represented in India by some of its noblest species. The *gaur*, the "bison" of sportsmen, is found in all the hill jungles of the country, in the Western Gháts, in Central India, in Assam, and in British Burmah. This animal sometimes attains the height of twenty hands (close on seven feet), measuring from the hump above the shoulder. Its short curved horns and skull are enormously massive. Its color is dark chestnut, or coffee-brown. From the difficult nature of its habitat, and from the ferocity with which it charges an enemy, the pursuit of the bison is no less dangerous and no less exciting than that of the tiger or the elephant. The wild buffalo (*Bubalus arni*) differs from the tame buffalo only in being larger and more fierce. The finest specimens come from Assam and Burmah.

The rat and mouse family is only too numerous. Conspicuous in it is the loathsome bandicoot, which sometimes measures two feet in length, including its tail, and weighs three pounds. It burrows under houses, and is very destructive to plants, fruit, and even poultry. More interesting is the tree rat, a native of Bengal, about seven inches long, which makes its nest in cocoanut palms and bamboos. The voles or field mice (genus *Arvicola*) occasionally multiply so exceedingly as to diminish the out-turn of the local harvest, and to require special measures to be organized for their suppression.

The ornithology of India, though it is not considered so rich in specimens of gorgeous and variegated plumage as that of other tropical regions, contains many splendid and curious varieties. Some are clothed in nature's gay attire, others distinguished by strength, size, and fierceness. The parrot tribe is the most remarkable for beauty.

The serpent tribe in India is numerous; they swarm in all the gardens, and intrude into the dwellings of the inhabitants, especially in the rainy season. Most are comparatively harmless, but the bite of others is speedily fatal. The cobra di capello (*Naga tripudians*)—the name given to it by the Portuguese, from the appearance of a hood which it produces by the expanded skin about the neck—is the most dreaded. It seldom exceeds three or four feet in length, and is about an inch and a quarter thick, with a small head, covered on the forepart with large smooth scales; it is of a pale brown color above, and the belly is of a bluish-white tinged with pale brown or yellow. The Russelian snake (*Daboia russellii*), about four feet in length, is of a pale yellowish-brown, beautifully variegated with large oval spots of deep brown, with a white edging. Its bite is extremely fatal. Itinerant showmen carry about these serpents, and cause them to assume a dancing motion for the amusement of the spectators. They also give out that they render snakes harmless by the use of charms or music—in reality it is by extracting the venomous fangs. But, judging from the frequent accidents which occur, they sometimes dispense with this precaution. All the salt-water snakes in India are poisonous, while the fresh-water forms are wholly innocuous. Sir J. Fayrer has demonstrated that there is no cure for the bite of the cobra, if the snake is full-grown, and if its poison fang is full and is not interfered with by clothing. The most hopeful remedy in all cases of snake bite is the injection of ammonia. The loss of life from this cause in India is painful to contemplate, nor does any means of diminishing the evil seem feasible. It is impossible to exterminate poisonous snakes altogether, even in England. In India the impossibility is yet more evident, from the greater number of the snakes, the character of the country, and the scruples of the people. Something, however, is being effected by the offer of rewards. In 1877 a total of 16,777 persons are reported to have been killed by snakes, as compared with only 819 by tigers.

The other reptiles include two varieties of crocodile and the gavial. These are more ugly in appearance than destructive to human life. Scorpions also abound.

All the waters of India—the sea, the rivers, and the tanks—swarm with a great variety of fishes, which are caught in every conceivable way, and furnish a considerable proportion of the food of the poorer classes.

The insect tribes in India may be truly said to be innumerable; nor has anything like a complete classification been given of them in the most scientific treatises. The heat and the rains give incredible activity to noxious or troublesome insects, and to others of a more showy class, whose large wings surpass in brilliancy the most splendid colors of art. Stinging mosquitoes are innumerable, and moths and ants of the most destructive kind, as well as others equally noxious and disagreeable. Among those which are useful are the bee, the silkworm, and the insect that produces lac. Clouds of locusts occasionally appear, which leave no trace of green behind them, and give the country over which they pass the appearance of a desert.

THE PEOPLE.

The population of India, with Burmah, amounts to 295,000,000, or, as already mentioned, more than double the number which Gibbon estimated for the Roman empire in the height of its power. But the English Government, like the Roman, has respected the rights of native chiefs who are willing to govern peaceably and well, and one-third of the country still remains in the hands of hereditary rulers.

For the first time in the history of India an attempt was made in the years 1871–72 to ascertain the population of the country by actual counting. The results obtained on that occasion, though in certain points they leave much to be desired, may be accepted generally as a tolerable approximation to the truth. Prior to this census, occasional enumerations had been made, with varying degrees of accuracy, in some of the provinces; while in others mere conjectural estimates had been allowed to pass uncriticised. In Bengal, for example, where statistical inquiry was in a backward state, the government had year by year accepted a loose estimate of 42,000,000 for the population under its control, and based upon this all its calculations for legislation and finance. The census of 1901 disclosed a total of nearly 80,800,000 for Bengal and Assam, being an increase upon the estimate of more than one-half. In Berar, or the Assigned Districts of Hyderabad, a census had been taken in 1867, in the Punjab in 1868, and in Oudh in 1869. In these provinces, therefore, it was considered impolitic to trouble the people by a fresh enumeration. Throughout all the rest of India under British administration, including the native state of Mysore, a general census was effected on uniform principles, which may be said to have begun in November, 1871, and ended in August, 1872. So far as possible, the work was done in a single night; but in certain remote and uncivilized tracts it was of necessity prolonged over several months. Considering the absolute novelty of the undertaking, at least in some provinces, and the scanty means at the disposal of the authorities, the general accuracy of the results may be regarded with not a little satisfaction. Subsequent local investigations tend to show that the numbers were under rather than overstated. In a few cases paid enumerators were engaged; but generally the work was left to the ordinary staff of each district, assisted by the police, the landlords, and their agents. The total expenditure throughout all British India was only £82,203, being at the rate of less than half a farthing per head. The suspicions of the ignorant villagers were naturally aroused by the counting, which they imagined to be preliminary to some fresh exaction by the Sarkár or government. Only in two or three cases was any real opposition offered; and there is little reason to believe that any material evasion was accomplished. The results of this enumeration are here given:

"The total population of British India in 1901 numbered in all 231,085,132 persons, on an area of 985,002 square miles, being an average of 234 persons per square mile. Deducting the frontier province of Assam and British Burmah beyond the sea, the average is 243 persons per square mile. The population of the several native states is returned, partly from actual enumeration and partly from mere guessing, at 63,181,569 persons, on an area of 655,695 square miles, being an average of ninety-six persons to the square mile. The French possessions have an area of 178 square miles and a population of 271,460 persons; the Portuguese possessions, 1,086 square miles and 407,712 persons." The aggregate figures for all India at the present time (1902) are 1,559,603 square miles and 294,266,701 persons.

The schedules of the census fail entirely to give a satisfactory classification of the races among which the vast population of India is divided. Using language as our criterion, the people might perhaps be arranged in five classes—(1) The old races of the south, known as the Dravidian stock, which includes, not only the great peoples using the literary languages of Tamil, Telugu, Malayálam, and Kanarese, but also scattered tribes speaking dialects of the same family, who are found as far north as the hills of Chutiá Nágpur; (2) the hill tribes of Central India, from the Bhíls of Bombay to the Santáls of Bengal, whose physical characteristics are negroid, and whose family of languages has received the name of Kolarian; (3) the tribes of Indo-Chinese origin, who inhabit the southern slopes of the Himálayas, the greater part of the Assam valley, and the whole of Burmah; it seems probable that the semi-Hinduized low castes of Northern Bengal also belong to this stock; (4) high-caste Hindus, or that offshoot of the august Aryan race, which has imposed its language, its religion, and its name upon the greater part of the country; (5) successive waves of Mahometan conquerors, Arab, Afghán, Mughal, and Persian, who form in the aggregate but an infinitesimal element in the general population. Whether pure Aryans are now to be traced in any other class than that of the Bráhmans may perhaps be disputed. Even the so-called Rájputs have probably a considerable admixture of Scythic blood. The Vaisya or third caste of Manu's system is admitted to be almost extinct, while his Súdras are to be found in the preëxisting non-Aryan population.

Principal Divisions of the Population.

RACE, ETC.	Number.	Tracts Where Most Numerous.
Hindus.		
Brahmans..........	10,131,541	Northwest Provinces, Oudh, Bengal, Madras.
Rajputs............	5,641,138	Northwest Provinces, Bengal, Oudh, Punjab.
Out-castes..........	8,712,998	Madras.
Aboriginal tribes....	17,716,825	Bengal, Central Provinces, Assam.
Native Christians...	595,815	South and West.
Mahometans.		
Mughals....	219,755	Punjab.
Afghans or Pathans.	1,841,693	"
Sayyids............	790,984	
Shaikhs............	4,700,320	
Foreigners.		
Parsis..............	69,000	Bombay city and Surat.
Nepalis............	31,000	Bengal.
Manipuris..........	12,000	Assam.
Arabs..............	8,300	Bombay.
Persians............	3,500	"
Armenians..........	1,250	Bengal.
Chinese............	13,300	Burmah.
Malays............	1,500	"
Jews..............	7,600	Bombay.
Eurasians and Indo-Portuguese..	108,000	Calcutta, Madras, and Bombay cities.
Europeans..........	121,000	of whom 75,700 are British.

Among Mahometans, who number in all 40,227,552, four classes are commonly distinguished. *Mughals*, or the descendants of the last conquering race, number only 219,755, of whom nearly half are to be found in the Punjab. *Afghâns* or *Pathâns* on the other hand, from their proximity to the frontier, are much more strongly represented, numbering 1,841,693 in all, chiefly in the Punjab and in the Rohilkhand division of the northwest. *Sayyids*, who claim to be lineally descended from the prophet, number 790,984; and *Shaikhs*, 4,700,320. The remainder are unspecified, but the following tribes or classes among Indian Musalmáns are worthy of notice: In Bengal the vast majority of Mahometans manifestly belong to the same race as the lowest castes of Hindus. They are themselves subdivided into many classes, which in their devotion to hereditary occupations are scarcely to be distinguished from Hindu castes. Of late years a reforming spirit has arisen, leading them to abandon the polytheistic customs and festivals which they shared with their Hindu fellow-villagers. In the Punjab, besides the Pathân immigrants from across the frontier, Islam has taken a strong hold of the native population. The census returned upward of 1,300,000 Jâts, 700,000 Râjputs, and 424,000 Gujars among the Musalmáns. Here, again, the Mahometans are not strongly distinguished from their Hindu brethren. Baluchis from beyond the frontier number 235,000 in the Punjab, and 145,000 in Sind. Bombay possesses three peculiar classes of Musalmáns, each of which is specially devoted to maritime trade—the *Memons*, numbering 49,000, chiefly in Sind; the *Borahs*, 86,000, mainly in Guzerat; the *Khojahs*, nearly 18,000, of whom half live in the island of Bombay. In southern India the majority are known as Dakhani Musalmáns, being descendants of the armies led by the kings and the nawábs of the Deccan. But the two peculiar races of the south are the *Moplas* (613,000) and the *Labbays* (312,000), both of which are seated along the coast and follow a seafaring life. They are descended from the Arab traders who settled there in very early times, and have been recruited partly by voluntary adhesions and partly by forcible conversions during the persecutions of Hyder Alí and Tipú Sultán. The Moplas of Malabar are notorious for repeated outbreaks of bloody fanaticism.

The Mahometans are most numerous, as might be expected, along the valley of the Indus, from Karáchi (Kurrachee) to Peshâwar. In the Bombay province of Sind they number 78 per cent. of the total population. In the Punjab generally the proportion is 53 per cent., rising to 93 per cent. in the frontier district of Peshâwar. In the Northwestern Provinces, and also in Oudh, the proportion of Mahometans nowhere exceeds 23 per cent., though that part of the country was the seat of successive Musalmán empires for many centuries. In Lower Bengal, on the other hand, the faith of Islam has exercised a more permanent effect upon the population, especially in the valley of the Brahmaputra. The average of Mahometans in the whole province is 33 per cent., rising to 80 per cent. in the deltaic districts of Bográ and Rájsháhí. Here, again, it is found that the Mahometans are not most numerous in the neighborhood of the great Musalmán capitals, Gaur, Rájmahál, Dacca, and Murshidábád, but in the densely populated agricultural tracts, where the semi-aboriginal tribes appear to have willingly embraced Islam in preference to remaining outcasts beyond the exclusive pale of Hinduism.

The Síkhs are almost entirely confined to the Punjab, where they number only 6.50 per cent. of the population. Their stronghold is the country between the rivers Rávi and Sutlej (Satlaj), including the historical cities of Lahore, Amritsar, Ambála (Umballa), and Jalandhar. In no district do they form more than 17 per cent.

Of the total number of 897,682 Christians, about 250,000 are believed to be Europeans or to have European blood in their veins. The south of India is the only part where the exertions of the missionaries can be said to be visible in the statistics of population. In the Madras presidency generally, Christians number 533,760, or 1.71 per cent. of the total. Of these, about 416,000 are returned as Roman Catholics, and about 118,000 as Protestants. Nearly one-fifth of all the Christians are found in the single district of Tinnevelli, and they are numerically next strongest in Madura, Tanjore, Trichinopoli, South Kanara and Malabar. Christianity has been known in southern India for many centuries. A Pehlevi inscription in the ancient church of the St. Thomas' Mount near Madras city indicates a settlement of Manichæans or Persian Christians on the eastern coast, as well as on the west; and tradition speaks of the preaching of the apostle St. Thomas in Madras, Tinnevelli, and Malabar. The adherents of the Syrian church in Malabar, Travancore, and Cochin are the most ancient Christian community in the south. After these come the Roman Catholics, who trace their origin to the teaching of St. Xavier and the Madura Jesuits. The Protestant churches date only from about the beginning of the present century, but their progress since that time has been considerable. In Bombay there are 126,063 Christians, of whom nearly 83,000, chiefly Indo-Portuguese, are returned as Roman Catholics. In Bengal the Christians number only 90,763, but since the date of the census missionary effort has been very successful among the hill tribes of Chutiá Nágpur. In the Northwestern Provinces there are 22,196 Christians, in the Punjab 22,154, in the Central Provinces 10,477, in Mysore 25,676, in Coorg 2,410, and the remainder are scattered over Assam, Berar, and Ajmír. In British Burmah the Christians are proportionately more numerous than in any other province, amounting to 52,299, or 1.90 per cent., chiefly converts from the hill tribe of Karens. It should be remembered that the above figures are exclusive of the native states, in which the Christians amount to about 700,000, making a total in round numbers of 1,500,000 for all India.

AGRICULTURE.

The cultivation of the soil is the occupation of the Indian people, in a sense which is difficult to realize in England, and which cannot be adequately expressed by figures. As the land tax forms the mainstay of the imperial revenue, so the *ráyat* or cultivator constitutes the unit of the social system. The organized village community contains many other members besides the cultivators, but they all exist for his benefit, and all alike are directly maintained from the produce of the village fields. Even in considerable towns, the traders and handicraftsmen almost always possess plots of land of their own, on which they raise sufficient grain to supply their families with food. The operations of rural life are familiar to every class. They are enveloped in a cloud of religious sanctions, and serve to mark out by their recurring periods the annual round of common life. According to the returns of the general census of 1872, the number of adult males engaged in agriculture amounts to nearly 35,000,000, or 56.2 per cent. of the total. To these ought to be added almost all the laborers, an additional 7,500,000, or 12.3 per cent.—thus raising the grand total of persons directly supported by the land to more than two-thirds of the entire number of adult males, besides those indirectly or incidentally connected with it.

But though agriculture thus forms the staple industry of the country, its practice is pursued in different provinces with infinite variety of detail. Everywhere the same perpetual assiduity is found, but the inherited experience of generations has taught the cultivators to adapt their simple methods to differing circumstances. For irrigation, native patience and ingenuity have devised means which compare favorably with the colossal projects of government. Manure is copiously applied to the more valuable crops whenever manure is available, its use being limited by poverty and not by ignorance. The rotation of crops is not adopted as a principle of cultivation; but in practice it is well known that a succession of exhausting crops cannot be taken in consecutive seasons from the same field, and the advantage of fallows is widely recognized. The periodicity of the seasons usually allows two, and sometimes three, harvests in the year, but not necessarily, nor indeed usually, on the same fields. For inexhaustible fertility, and for retentiveness of moisture in a dry year, no soil in the world can surpass the *regar* or "black cotton soil" of the Deccan. In the broad river basins, the inundations deposit annually a fresh top-dressing of silt, thus superseding the necessity of manures.

The name of rice has from time immemorial been so closely associated with Indian agriculture, that it is difficult to realize how comparatively small an area is planted with this crop. If we except the deltas of the great rivers and the long strip of land fringing the western coast, rice may be called an occasional crop throughout the remainder of the peninsula. But where rice is grown, it is grown to the exclusion of all other crops. In British Burmah, out of a total cultivated area of 2,833,520 acres, as many as 2,554,853 acres, or 90 per cent., are under rice. Independent Burmah, on the other hand, grows no rice, but imports largely from British territory. For Bengal, unfortunately, no general statistics are available. But taking Rangpur as a typical district, it was there found that 1,500,000 acres, out of a classified total of a little over 1,750,000 acres, or 88 per cent., were devoted to rice. Similar proportions hold good for the province of Orissa, the deltas of the Godávari, Kistna, and Káveri (Cauvery), and the lowlands of Travancore, Malabar, Kánara, and the Concan. For the Northwestern Provinces and Oudh, again, no agricultural statistics are available; but though rice, grown in damp localities, or with the help of irrigation, forms a favorite food for the upper classes, the local supply requires to be supplemented by importation from Bengal. Throughout the remainder of the country, except in Assam, which is agriculturally a continuation of the Bengal delta, the cultivation of rice occupies but a subordinate place. The average out-turn per acre in Bengal has been estimated at fifteen *maunds*, or 1,200 pounds of cleaned rice. In the years 1877–78, when famine was raging in southern India, the total exports of rice from Calcutta amounted to more than 16,000,000 hundredweight. In British Burmah there is but a single rice harvest in the year, corresponding to the *áman* of Bengal. The grain is reddish in color and of a coarse quality; but the out-turn is much higher than in Bengal, reaching in some places an average of 2,000 and 2,500 pounds per acre. The annual exports of rice from Burmah amount to about 12,000,000 hundred weight. Besides being practically the sole crop grown in the deltaic swamps, rice is raised in patches in all the hill-valleys, from Coorg to the Himálayas.

Wheat is grown to some extent in almost every district; but, broadly speaking, it may be said that wheat does not thrive where rice does, nor, indeed, anywhere south of the Deccan. The great wheat-growing tract of India is the Punjab, where over 7,000,000 acres, or 37 per cent. of the total cultivated area, are under this crop. For the Northwestern Provinces and Oudh, in default of actual statistics, it has been estimated that the total area under wheat is as large as in the Punjab, though the relative proportion is less. Wheat is also grown in Behar and in the districts of Bengal that lie south of the Ganges. In the Central Provinces, wheat is grown on 23 per cent. of the cultivated area, being the chief crop in the districts of Hoshangábád, Narsinhpur, and Ságar. In Bombay the corresponding proportion is less than 5 per cent., and in Sind 12 per cent. It has been conjectured that the total area under wheat in India is equal to the area under the same crop in the United States. Nor is the general out-turn contemptible, averaging about thirteen bushels per acre in the Punjab, as compared with an average of fifteen and one-half bushels for the whole of France. The quality, also, of the grain is high enough to satisfy the demands of English millers; and "Calcutta Club No. 1" commands a price in Mark Lane not much below that of the finest Australian or Californian produce. Unfortunately, when a prosperous trade with Europe seemed on the point of establishing itself, the terrible year 1877–78 supervened, and India now has to fight against the position of vantage occupied by the United States. According to the system of classification in Upper India, wheat ranks as a *rabí* or spring crop, being reaped at the close of the cold weather in April and May. Wherever possible, it is irrigated; and the extension of canals through the Gangetic Doáb has largely contributed to the substitution of wheat for inferior cereals.

Taking India as a whole, it may be affirmed that the staple food grain is neither rice nor wheat, but millet, which is probably the most prolific grain in the world, and the best adapted to the vicissitudes of a tropical climate. Excluding the special rice-growing tracts, varieties of millet are grown more extensively than any other crop from Madras, in the south, at least as far as Rájputána, in the north. The two most common kinds are great millet (*Holcus Sorghum* or *Sorghum vulgare*), known as *joár* or *jawárí* in the languages derived from the Sanskrit, as *jonna* in Telugu, and as *cholam* in Tamil; and spiked millet (*Holcus spicatus* vel *Penicillaria spicata*), called *bájra* in the north and *kambu* in the south. In Mysore and the neighboring districts *rágí* (*Eleusine coracana*), called *náchani* in Bombay, takes the first place. According to the Madras system of classification, these millets all rank as "dry crops," being watered only by the local rainfall, and sown under either monsoon; farther north they are classed with the *kharíf* or autumn harvest, as opposed to wheat. Indian corn is cultivated to a limited extent in all parts of the country; barley, in the upper valley of the Ganges, throughout the Punjab, and in Himálayan valleys; oats, only as an experimental crop by Europeans. *Joár* and *rágí*, but not *bájra*, are invaluable as fodder for cattle.

Oil-seeds also form an important crop in all parts of the country, being, perhaps, more universally grown than any other, as oil is necessary, according to native customs, for application to the person, for food, and for burning in lamps. In recent years the cultivation of oil-seeds has received an extraordinary stimulus, owing to the demand for export to Europe, especially to France; but as they can be grown after rice, etc., as a second crop, this increase has hardly at all tended to diminish the production of food grains. The four chief varieties grown are mustard or rape seed, linseed, *tíl* or gingelly (sesamum), and castor oil. Bengal and the Northwestern Provinces are at present the chief sources of supply for the foreign demand, but gingelly is largely exported from Madras, and, to a smaller extent, from Burmah.

Vegetables are everywhere cultivated in garden plots for household use, and also on a larger scale in the neighborhood of great towns. Among favorite native vegetables, the following may be mentioned: The egg-plant, called *brinjal* or *baigan* (*Solanum Melongena*), potatoes, cabbages, cauliflower, radishes, onions, garlic, turnips, yams, and a great variety of cucurbitaceous plants, including *Cucumis sativus*, *Cucurbita maxima*, *Lagenaria vulgaris*, *Trichosanthes dioica*, and *Benincasa cerifera.* Of these, potatoes, cabbages and turnips are of recent introduction. Almost all English vegetables can be raised by a careful gardener. Potatoes thrive best on the higher elevations, such as the Khásí hills, the Nílgiris, the Mysore uplands, and the slopes of the Himálayas; but they are also grown even in lowland districts. They were first introduced into the Khásí hills in 1830, and they now constitute the principal crop, the annual export to the Calcutta market being more than 7,000 tons, valued at £50,000.

Among cultivated fruits are the following: Mango (*Mangifera indica*), plantain (*Musa paradisiaca*), pine-apple (*Ananassa sativa*), pomegranate (*Punica granatum*), guava (*Psidium pomiferum* et *P. pyriferum*), tamarind (*Tamarindus indica*), jack (*Artocarpus integrifolia*), custard-apple (*Anona squamosa*), pawpaw (*Carica Papaya*), shaddock (*Citrus decumana*), and several varieties of fig, melon, orange, lime, and citron. According to the universal verdict of Europeans, no native fruits can compare with those of England. But the mangoes of Bombay, of Múltán, and of Maldah in Bengal, and the oranges of the Khásí hills, enjoy a high reputation; while the guavas of Madras are made into an excellent preserve.

Among spices, for the preparation of curry and other hot dishes, turmeric and chillies hold the first place, being very generally cultivated. Next in importance come ginger, coriander, aniseed, black cummin, and fenugreek. Pepper proper is confined to the Malabar coast, from Kánara to Travancore. Cardamoms are a valuable crop in the same locality, and also in the Nepálese Himálayas. *Pán* or betel-leaf is grown by a special caste in most parts of the country. Its cultivation requires constant care, but is highly remunerative. Betel-nut or areca is chiefly grown in certain favored localities, such as the deltaic districts of Bengal and the highlands of southern India.

Besides betel-nut (*Areca Catechu*), the palms of India include the cocoa-nut (*Cocos nucifera*), the bastard date (*Phœnix sylvestris*), the palmyra (*Borassus flabelliformis*), and the true date (*Phœnix dactylifera*). The cocoa-nut, which loves a sandy soil and a moist climate, is found in greatest perfection along the strip of coast-line that fringes the west of the peninsula, where it ranks next to rice as the staple product. The bastard date, grown chiefly in the country around Calcutta and in the northeast of the Madras presidency, supplies both the jaggery sugar of commerce and intoxicating liquors for local consumption. Spirit is also distilled from the palmyra, especially in the neighborhood of Bombay and in the southeast of Madras. The true date is almost confined to Sind.

Sugar is manufactured both from the sugar-cane and from the bastard date-palm, but the total production is inadequate to the local demand. The best cane is grown in the Northwestern Provinces, on irrigated land. It is an expensive crop, requiring much attention, and not yielding a return within the year; but the profits are proportionately large. In Bengal the manufacture of sugar for exportation has declined during the century; but in Jessor district the preparation of date-sugar is a thriving and popular industry. The manufacture of sugar is everywhere in the hands of natives, except in the case of the Aska factory in the Madras district of Ganjám, and the Ashtagrám factory in Mysore. Both these factories, which use sugar-cane and not date, have received honorable notice at exhibitions in Europe.

Cotton holds the first place among agricultural products grown for export. From the earliest times, cotton has been grown in sufficient quantities to meet the local demand, and even in the last century there was some slight export which was carefully fostered by the East India Company. But the present importance of the crop dates only from the crisis in Lancashire caused by the American war. Prior to 1860 the exports of raw cotton from India used to average less than £3,000,000 sterling a year; but after that date they rose by leaps, until in 1866 they reached the enormous total of £37,000,000. Then came the crash, caused by the restoration of peace in the United States, and the exports fell, until they now average little more than £8,000,000 a year. The fact is that Indian cotton has a short staple, and cannot compete with the best American cotton for spinning the finer qualities of yarn. But while the cotton famine was at its height, the cultivators were intelligent enough to make the most of their opportunity. The area under cotton increased enormously, and the growers managed to retain in their own hands a fair share of the profit.

Jute ranks next after cotton as a fiber crop. The extension of its cultivation has been equally rapid, and it is yet more limited in its area, being confined to northern and eastern Bengal. In this tract, which extends from Purniah to Goálpárá, north of the Ganges for the most part, and along both banks of the Brahmaputra, jute is grown on almost every variety of soil. The chief characteristic of the cultivation is that it remains entirely under the control of the cultivator. Practically a peasant proprietor, he increases or diminishes his cultivation according to the state of the market, and keeps the profits in his own hands. The demand for jute in Europe has contributed more than any administrative reform to raise the average standard of comfort throughout eastern Bengal. In 1872, when speculation was briskest, it is estimated that about 1,000,000 acres were under jute, distributed over sixteen districts, which had a total cultivable area of 23,000,000 acres. The total export from Calcutta in that year was about 7,000,000 hundredweights, valued at £4, 142,548. Both quantities and prices have since somewhat declined, but the business remains on a stable footing.

Indigo, though relatively of less importance than formerly, is still the foremost staple grown by European capital. In Bengal Proper its cultivation has greatly declined since the early years of this century. English planters have abandoned the districts of Húglí (Hooghly), the Twenty-four Parganás, Dacca, Farídpur, Rangpur, and Pabná, which are dotted with the sites of ruined factories. In Nadiyá, Jessor, Murshidábád, and Maldah, the industry is still carried on, but it has not recovered from the depression caused by the indigo riots of 1860, and the emancipation of the peasantry by the Land Act of 1859. Dye of superior quality is manufactured in Midnapur, along the frontier of the hill tracts. But indigo cultivation on the old scale still flourishes in North Behar, from which is derived one-half of the total exports from Calcutta. No accurate statistics of area are available; but in Tirhut alone there are fifty-six principal concerns, with seventy outworks, producing annually about 20,000 *maunds* of dye; in Sáran, thirty principal concerns and twenty-five outworks, producing about 12,000 *maunds;* in Champáran, seven large concerns, producing also 12,000 *maunds.* It has been estimated that the total amount of money annually distributed by the planters of North Behar cannot be less than £1,000,000. Across the border, in the Northwestern Provinces, indigo is grown and manufactured to a considerable extent by native cultivators. In the Punjab, also, indigo is an important crop, especially in the districts of Múltán, Muzaffargarh, and Derá Ghází Khán. In Madras, where it is grown and manufactured entirely by the natives, the total area under indigo is about 300,000 acres, chiefly in the northeast of the presidency, extending along the coast from Kistna to South Arcot, and inland to Karnúl and Cuddapah.

The opium of commerce is grown and manufactured in two special tracts—(1) the valley of the Ganges around Patná and Benares, and (2) a fertile table-land in Central India, corresponding to the old kingdom of Málwá, for the most part still under the rule of native chiefs, among whom Sindhia and Holkar rank first. In the latter of these two regions the cultivation of poppy is free, and the duty is levied as the opium passes through the British presidency of Bombay; in the former, the cultivation is a strict government monopoly. Opium is also grown for local consumption throughout Rájputána, and to a very limited extent in the Punjab and the Central Provinces. Throughout the rest of India it is absolutely prohibited. In the Ganges valley, the cultivation is supervised from two agencies, with their headquarters at Patná and Gházípur, at which two towns alone the manufacture is conducted. The amount of opium grown in native states and exported from Bombay is about equal, raising the average exports of opium to about £12,000,000, of which about £7,500,000 represent net profit to government.

Tobacco is grown in every district of India for local consumption. The soil and climate are favorable; but up to the present time the quality of native-cured tobacco is so inferior that it finds no market in Europe. The principal tobacco-growing tracts are Rangpur and Tirhut in Bengal, Kaira and Bombay, and the delta of the Godávari and Coimbatore and Madura districts in Madras. The two last-mentioned districts supply the raw material for the well-known "Trichinopoli cheroot," almost the only form of Indian tobacco that finds any favor with Europeans; the produce of the *lánkás* or alluvial islands in the Godávari is manufactured into "coconadas." The tobacco of northern Bengal is largely exported to British Burmah, for the Burmese, who are great smokers, do not grow sufficient for their own needs. Tobacco is also grown for export in the hill tracts of Chittagong. The tobacco of Tirhut is chiefly exported toward the west. The total area under tobacco in that district is estimated at 40,000 acres, the best quality being grown in *parganá* Saressa of the Tájpur subdivision.

Since 1875 a private firm of capitalists, backed by government support, has begun to grow tobacco and manufacture it for the European market. The scene of operations is two abandoned stud-farms at Gházípur, in the Northwestern Provinces, and at Pusa in the Bengal district of Tirhut. No less than five English or American curers were employed. Some of the produce was exported to England as "cured leaf;" but the larger part was put upon the Indian market in the form of "manufactured smoking mixture." This mixture is in demand at regimental messes and canteens, and has already found its way to Australia. The enterprise may now be said to have passed beyond the stage of experiment, and has probably opened a new sphere alike for Indian agriculture and European capital. The one essential condition of success is skilled supervision in the delicate processes of tobacco-curing.

The cultivation of coffee is confined to southern India, though attempts have been made to introduce the plant both into British Burmah and into the Bengal district of Chittagong. The coffee tract may be roughly defined as a section of the landward slope of the Western Gháts, extending from Kánara in the north to Travancore in the extreme south. That tract includes almost the whole of Coorg, the districts of Kádur and Hassan in Mysore, and the Nílgiri hills, enlarged by the recent annexation of the Wainád. Within the last few years the cultivation has extended to the Shevaroy hills in Salem district, and to the palni hills in Madura.

Unlike tea, coffee was not introduced into India by European enterprise; and even to the present day its cultivation is largely followed by the natives. The Malabar coast has always enjoyed a direct commerce with Arabia, and at an early date gave many converts to Islám. One of these converts, Bába Budan by name, is said to have gone on a pilgrimage to Mecca and to have brought back with him the coffee berry, which he planted on the hill range in Mysore, still called after him. According to local tradition this happened about two centuries ago. The shrubs thus sowed lived on, but the cultivation did not spread until the beginning of the present century. The state of Mysore and the Bába Budan range also witnessed the first opening of a coffee-garden by an English planter about 1840. The success of this experiment led to the extension of coffee cultivation into the neighboring tract of Manjarábád, also in Mysore, and into the Wainád subdivision of the Madras district of Malabar. From 1840 to 1860 the enterprise made slow progress; but since the latter date it has spread with great rapidity along the whole line of the Western Gháts, clearing away the primeval forest, and opening a new era of prosperity to the laboring classes.

The cultivation of tea in India commenced within the memory of men still living in 1890, and the industry now rivals indigo as a field for European capital. Unlike coffee-planting the enterprise owes its origin to the initiation of government, and has never attracted the attention of the natives. Early travelers reported that the tea-plant was indigenous to the southern valleys of the Himálayas; but they were mistaken in the identity of the shrub, which was the *Osyris nepalensis*. The real tea (*Thea viridis*), a plant akin to the camellia, grows wild in Assam, being commonly found throughout the hilly tract between the valleys of the Brahmaputra and the Bárak. There it sometimes attains the dimensions of a large tree; and from that, as well as from other indications, it has been plausibly inferred that Assam is the original home of the plant, which was thence introduced at a prehistoric date into China. The real progress of tea-planting in Assam dates from about 1851, and was greatly assisted by the promulgation of the Waste-land Rules of 1854. By 1859 there were already fifty-one gardens in existence, owned by private individuals; and the enterprise had extended from its original headquarters in Lakhimpur and Síbságar as far down the Brahmaputra as Kámrúp. In 1856 the tea-plant was discovered wild in the district of Cáchár in the Bárak valley, and European capital was at once directed to that quarter. At about the same time tea-planting was introduced into the neighborhood of the sanatorium of Dárjíling (Darjeeling), among the Sikkim Himálayas. The success of these undertakings engendered a wild spirit of speculation in tea companies both in India and at home, which reached its climax in 1865. The industry recovered but slowly from the effects of this disastrous crisis, and did not again reach a stable position until 1869. Since that date it has rapidly but steadily progressed, and has been ever opening new fields of enterprise. At the head of the Bay of Bengal in Chittagong district, side by side with coffee on the Nílgiri hills, on the forest-clad slopes of Chutiá Nágpur, amid the low-lying jungle of the Bhután Dwars, and even in Arakan, the energetic pioneers of tea-planting have established their industry. Different degrees of success may have rewarded them, but in no case have they abandoned the struggle. The market for Indian tea is practically inexhaustible. There is no reason to suppose that all the suitable localities for its growth have yet been tried; and we may look forward to the day when India shall not only rival but supersede China in her staple product.

The introduction of the quinine-yielding cinchona into India is a remarkable example of success rewarding the indefatigable exertions of a single man. When Mr. Clements Markham undertook the task of transporting the seedlings from South America in 1860, cinchona had never before been reared artificially. But the novel experiment in arboriculture has not only been successfully conducted, but has proved remunerative from a pecuniary point of view. A cheap febrifuge has been provided, in the form of the mixed cinchona alkaloids, for the fever-stricken population of the Indian plains, while the surplus bark sold in Europe more than repays interest upon the capital expended. These results have been produced from an expenditure of about £100,000. The headquarters of cinchona cultivation are on the Nílgiri hills, where government owns several plantations covering an aggregate of about 1,000 acres, with about 570,000 full-grown plants. From the government plantations cinchona seeds and plants are annually distributed to the public in large quantities; and there are now several private plantations rivaling the government estates in area, and understood to be very valuable properties. The varieties of cinchona most commonly cultivated are *C. officinalis* and *C. succirubra;* but experiments are being conducted with *C. Calisaya*, *C. pubescens*, *C. lanceolata* and *C. pitayensis.* When the success of the enterprise was secure, government somewhat curtailed the extent of its own operations. No fresh land was taken up, but the plantations were kept free from weeds. The quinologist's department was abolished, and the bark sold in its raw state. From the central establishment on the Nílgiris, cinchona has been introduced into the Palni hills in Madura district, into the Wainád, and into the state of Travancore. Plantations have also been successfully opened by government near Merkara in Coorg, on the Bába Budan hills in Mysore, and in Sitang district in British Burmah. Failure has attended the experiments made at Mahábaleshwar in the Bombay presidency, and at Nongklao in the Khásí hills, Assam. But the success of the government plantation at Dárjíling, in northern Bengal, rivals that of the original plantation on the Nílgiris. The area has been gradually extended to more than 2,000 acres, and the bark is manufactured into quinine on the spot by a government quinologist. The species mostly grown is *C. succirubra*, which supplies a red colored bark, rich in its total yield of alkaloids, but comparatively poor in quinine proper. Efforts are being made to increase the cultivation of *C. Calisaya*, which yields the more valuable bark, but is difficult to propagate.

Sericulture in India is almost a stationary, if not a declining, industry. The large production in China, Japan, and the Mediterranean countries controls the European markets, and on an average of years the imports of raw silk into India now exceed the exports. The East India Company from the first took great pains to foster the production of silk. As early as 1767, two years after the grant of the financial administration of Bengal had been conferred upon the Company, we find the governor, Mr. Verelst, personally urging the *zamíndárs*, gathered at Murshidábád for the ceremony of the *púnyá*, "to give all possible encouragement to the cultivation of mulberry." In 1769 a colony of reelers was brought from Italy to teach the system followed in the filatures at Novi. The first silk prepared in the Italian method reached England in 1772, and Bengal silk soon became an important article of export. Similar efforts started at Madras in 1793 were abandoned after a trial of five years. Sericulture is said to have been introduced into Mysore by Tipú Sultán, and for many years continued to prosper. But recently the worms have been afflicted by a mysterious epidemic; and despite the enterprise of an Italian gentleman who imported fresh broods from Japan, the business has dwindled to insignificance. Bengal has always been the chief seat of mulberry cultivation. When the trading operations of the Company ceased in 1833, they owned eleven head factories in that province, each supplied by numerous filatures to which the cultivators brought in their cocoons. The annual export of raw silk from Calcutta was then about 1,000,000 pounds. But in those days the weaving of silk formed a large portion of the business of the factories. In 1779 Rennel wrote that at Kasímbázár (Cossimbazar) alone about 400,000 pounds were consumed in the several European factories. In 1802 Lord Valentia describes Jangipur as "the greatest silk station of the Company, with 600 furnaces, and giving employment to 3,000 persons."

When the Company abandoned trade on its own account, sericulture was forthwith taken up by private enterprise, and it still clings to its old headquarters. At the present time the cultivation of the mulberry is mainly confined to the Rájsháhí and Bardwán divisions of Lower Bengal. That branch of agriculture, together with the rearing of the silkworms, is conducted by the peasantry themselves, who are free to follow or abandon the business. The destination of the cocoons is twofold. They may either be sent to small native filatures, where the silk is roughly wound before being consumed in the hand-looms of the country; or they may be brought to the great European factories, which generally use steam machinery and consign their produce direct to Europe.

The cultivation of the mulberry is chiefly carried on in the districts of Rájsháhí, Bográ, Maldah, Murshidábád, Bírbhúm, Bardwán and Midnapur. No accurate statistics are available, but in Rájsháhí alone the area under mulberry is estimated at 80,000 acres. The variety grown as food for the silkworms is not the fruit-tree that is common in England, but a comparatively small shrub.

Besides the silkworm proper (*Bombyx mori*), fed upon the mulberry, several other species of silk-yielding worms abound in the jungles of India, and are utilized, and in some cases domesticated, by the natives. Throughout Assam especially, an inferior silk, produced in this way, has from time immemorial furnished the common dress of the people. These "wild silks" are known to commerce under the generic name of *tasar* or *tusser*, but they are really the produce of several distinct varieties of worm, fed on many different trees. The worm that yields *tasar* silk in Chutiá Nágpur has been identified as the caterpillar of *Antheræa paphia.* When wild, it feeds indiscriminately upon the *sál* (*Shorea robusta*), *baer* (*Zizyphus Jujuba*), and other forest trees; but in a state of semi-domestication it is exclusively reared upon the *ásan* (*Terminalia alata*), which grows conveniently in clumps. The cocoons are sometimes collected in the jungle, but more frequently bred from an earlier generation of jungle cocoons. The worms require constant attention while feeding to protect them from crows and other birds. They give three crops in the year—in August, November, and May—of which the second is by far the most important. The *tasar* silkworm is also found and utilized throughout the Central Provinces, in the hills of the Bombay presidency, and along the southern slope of the Himálayas. During the past twenty years repeated attempts have been made to raise this industry out of its precarious condition, and to introduce *tasar* silk into the European market. That the raw material abounds is certain, but the great difficulty is to obtain it in a state that will be acceptable to European manufacturers. Native spun silk is only fit for native hand-looms. In Assam two distinct qualities of silk are made, known as *eriá* and *mugá*. The former is obtained from the cocoons of *Phalæna cynthia*, and the worm is fed, as the native name implies, upon the leaves of the castor-oil plant (*Ricinus communis*). This variety may be said to be entirely domesticated, being reared indoors. *Mugá* silk is obtained from the cocoons of *Saturnia assamungis*. The moth, which is remarkable for its size, is found wild in the jungle, but the breed is so far domesticated that cocoons are brought from one part of the province to another, and the *súm* tree is artificially propagated to supply the worms with food.

The collection of lac is in a somewhat similar position to that of *tasar* silk. The lac insect abounds on certain jungle trees in every part of the country, and from time immemorial it has been collected by the wild tribes in order to be worked up into lacquered ware. European enterprise has tried, with small success, to place the industry upon a stable and remunerative basis. Though lac is to be found everywhere, the foreign exports are almost entirely confined to Calcutta, which draws its supplies from the hills of Chutiá Nágpur, and to a less degree from Assam and Mírzápur in the Northwestern Provinces. Lac is known to commerce both as a gum (shellac) and as a dye.

The efforts of government to improve the native methods of agriculture, by the establishment of model farms under skilled European supervision, have not been generally successful.

Throughout the whole of India, except in Sind and in the western districts of the Punjab, horned cattle are the only beasts used for plowing. The well-known humped breed of cattle predominates everywhere, being divided into many varieties. Owing partly to unfavorable conditions of climate and soil, partly to the insufficiency of grazing ground, and partly to the want of selection in breeding, the general condition of the cattle is miserably poor. As cultivation advances, the area of waste land available for grazing steadily diminishes, and the prospects of the poor beasts are becoming worse rather than better. Their only hope lies in the introduction of fodder crops as a regular stage in the agricultural course. There are, however, some fine breeds in existence. In Mysore the *amrit mahál*, a breed said to have been introduced by Hyder Alí for military purposes, is still kept up by government. In the Madras districts of Nellore and Karnúl the indigenous breed has been greatly improved under the stimulus of cattle shows and prizes, founded by British officials. In the Central Provinces there is a peculiar breed of trotting bullocks which is in great demand for wheeled carriages. The large and handsome oxen of Guzerat in Bombay and of Hariáná in the Punjab are excellently adapted for drawing heavy loads in a sandy soil. The worst cattle are to be found always in the deltaic tracts, but there their place is to a large extent taken by buffaloes. These last are more hardy than ordinary cattle; their character is maintained by crossing the cows with wild bulls, and their milk yields the best *ghí*, or clarified butter. In British Burmah, the returns show that the total number of buffaloes is just equal to that of cows and bullocks, being about 700,000.

Along the valley of the Indus, and in the sandy desert which stretches into Rájputána, camels supersede cattle for agricultural operations. In the Punjab, the total estimated number of camels is 170,000. The breed of horses has generally deteriorated since the demand for military purposes has declined with the establishment of British supremacy. In Bengal Proper, and also in Madras, it may be broadly said that horses are not bred. The chief breeds in Bombay are those of the Deccan and of Káthiáwár, in both of which provinces government maintains establishments of stallions. The Punjab, however, is the chief source of remounts for the cavalry regiments, the total number of horses in that province being returned at 80,000, in addition to 50,000 ponies. About the beginning of the present century, a stud department was organized to breed horses for the use of the Bengal army, but this system was abolished as extravagant and inefficient under the governor-generalship of Lord Mayo. Remounts are now obtained in the open market; but the government of the Punjab still maintains about 130 stallions, including sixty imported from England and forty Arabs. The best horses are bred by the Baluchí tribes along the western frontier. The best ponies come from Burmah, Manipur (the original home of the now well-known game of polo), and Bhután. Four great horse fairs are held in the year —at Ráwal Pindí, Derá Ghází Khán, Jhang and Derá Ismáil Khán. In recent years much attention has been paid in the Punjab to the breeding of mules for military purposes; and the value of these animals was conspicuously proved in the course of the operations in Afghánistán in 1879-80. Government maintains about fifty donkey stallions, of which four were imported from Spain, twenty-eight from Arabia, and twelve from Bokhara. Some of the mules bred reach the height of fifteen hands. The catching of elephants is now a government monopoly or under government supervision, except in Malabar and Travancore, where the old proprietors retain the right. The chief source of supply is the northeast frontier, especially the range of hills running between the valleys of the Brahmaputra and the Bárak. Sheep and goats are commonly reared in the wilder parts of the country for the sake of their wool. Both their weight for the butcher and their yield of wool are exceedingly low. In Mysore, and with considerable success at the Saidapet farm, attempts have been made to improve the breed of sheep by crossing with merino rams. Pigs of great size and most repulsive appearance are reared, and eaten by the lowest of out-castes.

The forests of India, both as a source of natural wealth and as a department of the administration, are beginning to receive their proper share of attention. Up to a recent date the destruction of forests by timber cutters, by charcoal burners, and above all by nomadic cultivators, was allowed to go on everywhere unchecked. The extension of cultivation was considered as the chief care of government, and no regard was paid to the improvident waste going on on all sides. But as the pressure of population on the soil became more dense, and the construction of railways increased the demand for fuel, the question of forest conservation forced itself into notice. It was recognized that the inheritance of future generations was being recklessly sacrificed to satisfy the immoderate desire for profit. And at the same time the importance of forests as affecting the general meteorology of a country was being learned from bitter experience in Europe. On many grounds, therefore, it became necessary to preserve what remained of the forests in India, and to repair the mischief of previous neglect even at considerable expense. In 1844 and 1847 the subject was actively taken up by the governments of Bombay and Madras. In 1864 Doctor Brandis was appointed inspector-general of forests to the government of India, and in the following year an act of the legislature was passed (No. VII. of 1865). The regular training of candidates for the Forest Department in the schools of France and Germany dates from 1867. In the short interval that has since elapsed, sound principles of forest administration have been gradually extended. Indiscriminate timber-cutting has been prohibited, the burning of the jungle by the hill tribes has been confined within bounds, large areas have been surveyed and demarcated, plantations have been laid out, and, generally, forest conservation has become a reality.

The practice of nomadic cultivation by the hill tribes may conveniently be described in connection with forest conservation, of which it is the most formidable enemy. In all the great virgin forests of India, in Arakan, on the northeast frontier of Assam and Chittagong, throughout the Central Provinces, and along the line of the Western Gháts, the aboriginal tribes raise their crops of rice, cotton, etc., in this manner. A similar system has been found to prevail in Madagascar; and indeed, from its simplicity and its appropriateness it may fairly be called the most primitive mode of agriculture known to the human race. Known as *toungya* in Burmah, *júm* on the northeast frontier, *dahya* in Central India, *kil* in the Himálayas, and *kumárí* in the Western Gháts, it is practiced, without any material differences, by tribes of the most diverse origin. Its essential features are the burning down of a patch of forest, and sowing the crop with little or no tillage on the clearing thus formed. The tribes of the western coast break up the cleared soil with a sort of hoe-pick and spade or even with the plow; in other parts the soil is merely scratched with a knife, or the seed is scattered on its surface without any cultivation at all. In some cases a crop is taken off the same clearing for two or even three years in succession, but more usually the tribe moves off every year to a fresh field of operations. To these nomad cultivators the words rhetorically used by Tacitus of the primitive Germans are strictly applicable: *Arva per annos mutant; et superest ager*. The wanton destruction thus wrought in the forests is simply incalculable. In addition to the timber trees deliberately burned down to clear the soil, the fire thus started not infrequently runs wild through the forest, and devastates many square miles. Wherever timber has any value from the proximity of a market, the first care of the Forest Department is to prohibit these fires, and to assign heavy penalties for any infringement of its rules. The success of a year's operations is mainly estimated by the degree in which the reserves have been saved from the flame.

Irrigation is everywhere dependent upon the two supreme considerations of water supply and land level. The sandy desert that extends from the hills of Rájputána to the basin of the Indus is more absolutely closed to irrigation than the confused system of hill and valley in Central India. Farther west, in the Indus valley, irrigation becomes possible, and in no part of India has it been conducted with greater perseverance and success. The entire province of Sind, and hardly less the lower districts of the Punjab, are absolutely dependent upon the floods of the Indus. Sind has been compared to Egypt, and the Indus to the Nile; but, in truth, the case of the Indian province is the less favorable of the two. In Sind the average rainfall is barely ten inches in the year, the soil is a thirsty sand, and, above all, the river does not run in confined banks, but wanders at its will over a wide valley. The rising of the Nile is a beneficent phenomenon, whose effects can be calculated with tolerable precision, and which the industry of countless generations has brought under control for the purposes of cultivation. In Sind the inundation is an uncontrolled torrent, which oftentimes does as much harm as good. Broadly speaking, no crop can be grown in Sind except under irrigation, and therefore the total cultivated area of about 3,000,000 acres may be regarded as entirely dependent upon artificial water-supply. The supply is derived from the river by two main classes of canals—(1) inundation channels, which only fill when the Indus is in flood, and (2) perennial channels, which carry off water by means of dams at all seasons of the year. The former are for the most part the work of ancient rulers of the country, or of the cultivators themselves; the latter have been constructed since the British conquest. In both cases care has been taken to utilize abandoned channels of the river. It is impossible to present a complete view of the results of irrigation, for in some provinces, as in Sind, it is treated as a department of land administration, while in others it is almost entirely conducted by private enterprise.

COMMERCE.

The trade of India may be considered under four heads:—(1) sea-borne trade with foreign countries; (2) coasting trade; (3) frontier trade, chiefly across the northern mountains; (4) internal traffic within the limits of the empire.

With an extensive seaboard, India has but very few ports. Calcutta monopolizes the commerce, not only of Lower Bengal, but of the entire basins of the Ganges and the Brahmaputra. Bombay is the sole outlet for the agricultural wealth of Guzerat, the Deccan, and the Central Provinces; while Karáchi (Kurrachee) performs a similar office for the Indus, and Rangoon for the Irawadi. The natural value of these four ports has been permanently confirmed by the construction of the main lines of railway communication. In the south of India only is sea-borne trade distributed along the coast. The western side has a succession of tolerable harbors, from Goa to Cochin. On the east there is not a single safe roadstead nor a navigable river, but ships anchor some distance off the shore at Madras, and at other points, generally near the mouths of the rivers. Of the total foreign trade of India, Calcutta and Bombay control about 40 per cent. each; Madras has 6 per cent., Rangoon 4 per cent., and Karáchi 2 per cent., leaving a balance of only 8 per cent. for all the remaining ports of the country. Calcutta and Bombay may be called the two centers of collection and distribution, to a degree without a parallel in other countries; and the growth of their prosperity is identical with the development of Indian commerce.

As regards the imports, the first thing to notice is the enormous predominance of two items—cotton goods and treasure. On an average of the last forty years, cotton goods form 33 per cent., or exactly one-third of the total, and treasure an additional 30 per cent. Next in order come metals (copper, which is largely used by native smiths, slightly exceeding iron, government stores, including munitions of war, boots, liquor, and clothing for soldiers, and railway plant; liquors, entirely for European consumption; coal for the use of the railways and mills; railway plant for the guaranteed companies; provisions, machinery and mill-work, and manufactured silk. It will thus be seen that, with the single exception of Manchester goods, no articles of European manufacture are in demand for native consumption, but only for the needs of the civilized administration, and no raw produce, except copper, iron, and salt.

Considering that England's export trade with India thus mainly depends upon piece-goods, it is curious to recollect the history of cotton manufacture. In the beginning of the seventeenth century the industry had not been introduced into England, and whatever demand there was for cotton in that country was satisfied by circuitous importations from India itself, where cotton-weaving is an immemorial industry. In 1641 "Manchester cottons," in imitation of Indian calicoes and chintzes, were still made of wool. Cotton is said to have been first manufactured in England in 1676. To foster the nascent industry, a succession of statutes were passed prohibiting the wearing of imported cottons; and it was not until after the inventions of Arkwright and others and the application of steam as a motive power had secured to Manchester the advantage of cheap production that these protective measures were entirely removed. In the present century Lancashire has rapidly distanced her instructors. During the five years 1840–45 the annual import of cotton manufactures into India averaged a little over £3,000,000 sterling. In each subsequent quinquennial period there has been a steady increase

The importation of treasure is perhaps still more extraordinary, when we bear in mind that it is not consumed in the using, but remains permanently in the country. During the same period of forty years the net import of treasure, deducting export, has reached the enormous aggregate of just £319,000,000 sterling, or more than £1, 6s.6d. per head of the 240,000,000 inhabitants of the peninsula. Of course, by far the larger portion of this was silver, but the figures for gold are by no means inconsiderable. On separating the reëxports from the imports, the attraction of gold to India appears yet more marked. Of the total imports of gold only 7 per cent. was reëxported, while for silver the corresponding proportion was 19 per cent. Roughly speaking, it may be concluded that India then absorbed about £3,000,000 sterling of gold a year. The supply is drawn chiefly from China, Ceylon, Great Britain, and Australia. The depreciation of silver that has since taken place has caused an enormous increase in the import of silver and a corresponding increase in the export of gold. The figures since 1876 do not show the normal state of things. But even in 1877–78, when the value of silver was at its lowest, though India drew upon its hoards of gold for export to the amount of more than £1,000,000 sterling, it yet imported more than £1,500,000, showing a net import of half a million of gold. It has been estimated that the gold circulation of India amounts to about 1,620,000 gold *mohars*, as compared with £158,000,000 of silver and £2,960,000 of copper. In addition, 10,000,000 sovereigns are said to be hoarded in India, mainly in the Bombay presidency, where the impression of St. George and the Dragon is valued on religious grounds.

The export of raw cotton has been subject to excessive variations. At the close of the last century cotton was sent to England in small quantities, chiefly the produce of the Central Provinces, collected at Mírzápúr and shipped at Calcutta, or the produce of Guzerat, dispatched from Surat. In the year 1805 the total export of cotton from Surat was valued at £108,000; in the same year the English returns show only 2,000 bales of East Indian cotton imported into Great Britain. But this figure was far below the average, for by 1810 the corresponding number of bales had risen to 79,000, to sink again to 2,000 in 1813, and to rise to 248,000 in 1818. Bombay did not begin to participate in this trade until 1825, but has now acquired the practical monopoly, since the railway has diverted to the west the produce of the Central Provinces. In 1834, when the commerce of India was first thrown open, 33,000,000 pounds were exported. Analyzing the exports of cotton during the forty years since 1840, we find that in the first quinquennial period they averaged two and one-third millions sterling in value, and did not rise perceptibly until 1858, when they first touched £4,000,000. From that date the increase was steady, even before the American exports were cut off by war in 1861. India then made the most of her opportunity, though quantity and quality did not keep pace with the augmented price. The highest figures of value were attained with £37,500,000 sterling in 1865, and the highest figure of quantity with 803,000,000 pounds in 1866. Thenceforth the decline has been constant, though somewhat irregular, the lowest figures both of quantity and value being those of 1878–79. The most recent feature of the trade is the comparatively small amount shipped to the United Kingdom, and the even distribution of the rest among Continental ports.

Second in importance to cotton as a raw material of British manufacture comes jute, the trade in which is a creation of less than thirty years. At the time of the London Exhibition of 1851 jute fiber was practically untried and unknown, while attention was even then actively drawn to rhea or China grass, which remains to the present day unmanageable by any cheap process. From time immemorial jute has been grown in the swamps of Eastern Bengal, and has been woven into coarse fabrics for bags and even clothing. As early as 1795 Doctor Roxburgh called attention to the commercial value of the plant, which he grew in the Botanical Gardens of Calcutta and named "jute," after the language of his Orissa gardeners, the Bengalí word being *pát* or *koshta*. In 1828–29 the total exports of jute were only 364 hundredweights, valued at £62. From that date the trade steadily grew, until in the quinquennial period ending 1847–48 the exports averaged 234,055 hundredweights. The Crimean war, which cut off the supplies of Russian flax and hemp from the Forfarshire weavers, made the reputation of jute.

The export of grain, as already noticed, is now in the aggregate larger than that of cotton. The two chief items are rice and wheat. Rice is exported from British Burmah, from Bengal, and from Madras. From the point of view of the English produce market rice means only Burmese rice, which is annually exported to the large amount of about 12,000,000 hundredweights, valued at £3,000,000. In the Indian tables this is all entered as consigned to the United Kingdom, though, as a matter of fact, the rice fleets from Burmah only call for orders at Falmouth, and are thence diverted to various English or Continental ports. India has a practical monopoly of the European market. An export duty is levied on rice in India at the rate of three *ánnás* per *maund*, or about 6d. per hundredweight. A similar duty on wheat was repealed in 1875, and that trade has since conspicuously advanced. In 1874–75 the export of wheat was about 1,000,000 hundredweights. Forthwith it increased year by year, until it exceeded 6,250,000 hundredweights, valued at nearly £3,000,000. In 1879 the quantity fell away to almost nothing, owing to the general failure of the harvest in the producing districts. The Punjab is the principal wheat-growing tract in India, but hitherto the chief supplies have come from the Northwestern Provinces and Oudh, being collected at Cawnpur and thence dispatched by rail to Calcutta.

Oil-seeds, also, were freed in 1875, the duty previous to that date having been 3 per cent. *ad valorem*. Ten years before, the average export was only about 4,000,000 hundredweights a year; but the fiscal change, coinciding with an augmented demand in Europe, has caused an increase of threefold. Linseed and rape are consigned mainly to the United Kingdom, while France takes almost the entire quantity of *tíl* or gingelly.

In actual amount, though not in relative importance, indigo holds its own in the face of competition from aniline dyes. The most noticeable feature in this trade is the diminishing proportion sent direct to England, and the wide distribution of the remainder. Of other dyes, safflower has greatly fallen off, being now only in demand for a rouge in China and Japan. The export of myrobalans, on the other hand, was greatly stimulated by the Russo-Turkish war, which interrupted the supply of valonia and galls from Asia Minor. Practically the whole is sent to the United Kingdom. Turmeric, also, exhibits an increase. Lac-dye, like other kinds of lac, shows a depressed trade.

No other export has made such steady progress as tea, which has multiplied more than fourfold in the space of ten years. Indian tea has now a recognized position in the London market, generally averaging about 4d. per pound higher in value than Chinese tea, but it has failed to win acceptance in most other countries, excepting Australia. The exports of coffee from India are stationary, if not declining.

Of manufactured goods, cotton and jute deserve notice, though by far the greater part of the produce of the Indian mills is consumed locally. Piece-goods belong to two classes. Colored goods, woven in handlooms, are exported from Madras to Ceylon and the Straits, to the annual value of about £230,000.

Jute manufactures consist of gunny bags, gunny cloths, and rope and twine, almost entirely the produce of the Calcutta mills. In all of these the value of the exports is increasing faster than the quantity, having multiplied nearly fourfold in the last five years.

In any community raised above primitive barbarism the aggregate volume of its internal trade must be far greater than that of its foreign commerce; but, from the nature of the case, it is impossible to estimate its amount or even to describe adequately its general character. On the one hand, there is the wholesale business connected with foreign commerce in its earliest stages—the collection of agricultural produce from a thousand little villages, its accumulation at a few great central marts, and its despatch to the seaboard, in return for which manufactured articles are distributed by the same channels, though in the reverse direction. On the other hand, there is the interchange of commodities of native growth and manufacture, sometimes between neighbors, but also between distant provinces. With a few unimportant exceptions, free trade is the rule throughout the vast peninsula of India, by land as well as by sea. The Hindus possess a natural genius for commerce, as is shown by the daring with which they have penetrated into the heart of Central Asia, and to the east coast of Africa. Among the benefits which British rule has conferred upon them is the removal of the innumerable shackles that a shortsighted despotism had imposed upon their talents.

Broadly speaking, the greater part of the internal trade remains in the hands of the natives. Europeans control the shipping business, and have a share in the collection of some of the more valuable staples of exports, such as cotton, jute, oil-seeds, and wheat. But the work of distribution and the adaptation of the supply to the demand of the consumer naturally fall to those who are best acquainted with native wants. Even in the presidency towns the retail shops are generally owned by natives. The Vaisya, or trading caste of Manu, has no longer any separate existence; but its place is occupied by several well-marked classes. On the western coast the Pársis, by the boldness and extent of their operations, tread close upon the heels of the most prosperous English houses. In the interior of the Bombay presidency, business is mainly divided between two classes, the Baniyas of Guzerat and the Márwárís from Rájputána. Each of these profess a peculiar form of religion, the former being Vishnuvites of the Vallabháchárí sect, the latter Jains. In the Deccan their place is taken by Lingáyats from the south, who again follow their own form of Hinduism, which is an heretical species of Siva worship. Throughout Mysore, and in the north of Madras, Lingáyats are still found, but along the eastern seaboard the predominating classes of traders are those named Chetties and Komatis. In Bengal many of the upper castes of Súdras have devoted themselves to general trade; but there again the Jain Márwárís from Rájputána and the Northwest occupy the front rank. Their headquarters are in Murshidábád district, and their agents are to be found throughout the valley of the Brahmaputra, as far up as the unexplored frontier of China. They penetrate everywhere among the wild tribes; and it is said that the natives of the Khásí hills are the only hillmen who do their own business of buying and selling. In the Northwestern Provinces and Oudh the traders are generically called Baniyas; and in the Punjab are found the Khatrís, who have perhaps the best title of any to regard themselves as descendants of the original Vaisyas. According to the general census of 1872, the total number of persons in all India returned as connected with commerce and trade was 3,224,000, or 5.2 per cent. of the adult males.

Local trade is conducted either at the permanent *bázárs* of great towns, at weekly markets held in certain villages, at annual gatherings primarily held for religious purposes, or by means of traveling brokers and agents. The cultivator himself, who is the chief producer and also the chief customer, knows little of the great towns, and expects the dealer to come to his own door. Each village has at least one resident trader, who usually combines in his own person the functions of money-lender, grain-dealer and cloth-seller. The simple system of rural economy is entirely based upon the dealings of this man, whom it is the fashion sometimes to decry as a usurer, but who is really the one thrifty person among an improvident population. Abolish the money-lender, and the general body of cultivators would have nothing to depend upon but the harvest of a single year. The money-lender deals chiefly in grain and in specie. In those districts where the staples of export are largely grown, the cultivators commonly sell their crops to traveling brokers, who re-sell to larger dealers, and so on until the commodities reach the hands of the agents of the great shipping houses. The wholesale trade thus rests ultimately with a comparatively small number of persons, who have agencies, or rather corresponding firms, at the great central marts. Buying and selling in their aspects most characteristic of India are to be seen, not at these great towns, nor even at the weekly markets, but at the fairs which are held periodically at certain spots in most districts. Religion is always the original pretext of these gatherings or *melás*, at some of which nothing is done beyond bathing in the river, or performing various superstitious ceremonies. But in the majority of cases, religion has become a mere excuse for secular business. Crowds of petty traders attend, bringing all those miscellaneous articles that can be packed into a peddler's wallet; and the neighboring villagers look forward to the occasion to satisfy alike their curiosity and their household wants.

MANUFACTURES.

Though India may be truly described as an agricultural and not a manufacturing country, yet it would be erroneous to infer that it is destitute of the arts of civilized life. It has no swarming hives of industry to compare with the factory centers of Lancashire, nor a large mining population, living under the soil rather than on it. In short, it has not reached that modern stage of industrial development which is based upon the use of coal and the discoveries of physical science. But in all manufactures requiring manual dexterity and artistic taste India may challenge comparison with England in the last century. The organization of Hindu society demands that the necessary arts, such as those of the weaver, the potter, and the smith, should be practiced in every village. The pride and display of the rival kingdoms, into which the country was formerly divided, gave birth to many arts of luxury that have not yet been entirely forgotten in the decayed capitals. When the first European traders reached the coast of India in the sixteenth century, they found a civilization among both "Moors" and "Gentoos" at least as highly advanced as their own. In architecture, in fabrics of cotton and silk, in goldsmith's work and jewelry, the people of India were then unsurpassed. But while the East has stood still, or rather retrograded (for, in the face of keen competition, to stand still is to retrograde), the West has advanced with a gigantic stride which has no parallel in the history of human progress. On the one hand, the downfall of the native courts has deprived the skilled workman of his chief market, while, on the other, the English capitalist has enlisted in his service forces of nature against which the village artisans in vain try to compete. The fortunes of India are bound up with those of a country whose manufacturing supremacy depends upon a great export trade. The tide of circumstances, more inexorable than artificial enactments, has compelled the weaver to exchange his loom for the plow, and has crushed out a multitude of minor handicrafts. Political economy, judging only by the single test of cheapness, may approve the result; but the philosopher will regret the increasing uniformity of social conditions, and the loss to the world of artistic tendencies which can never be restored.

Historically the most interesting, and still the most important in the aggregate, of all Indian industries are those conducted in every rural village of the land. The Hindu village system is based upon divison of labor quite as much as upon hereditary caste. The weaver, the potter, the blacksmith, the brazier, the oil-presser, are each members of the community, as well as inheritors of a family occupation. On the one hand, they have a secure market for their wares, and, on the other, their employers have a guarantee that their trades shall be well learned. Simplicity of life and permanence of employment are here happily combined with a high degree of excellence in design and honesty of execution. The stage of civilization below these village industries is represented by the hill tribes, especially those on the northeast frontier, where the weaving of clothes is done by the women of the family—a practice which also prevails throughout Burmah. A higher stage may be found in those villages or towns which possess a little colony of weavers or braziers noted for some specialty. Yet one degree higher is the case of certain arts of luxury, such as ivory carving or the making of gold lace, which chance or royal patronage has fixed at some capital now perhaps falling into decay. One other form of native industry owes its origin to European interference. Many a village in Lower Bengal and on the Coromandel coast still shows traces of the time when the East India Company and its European rivals gathered large settlements of weavers around their little forts, and thus formed the only industrial towns that ever existed in India. But when the Company abandoned its manufacturing business in 1833, these centers of industry rapidly declined; and the once celebrated muslins of India have been driven out of the market of the world by Manchester goods.

Cotton weaving may be called the oldest indigenous industry of India. The Greek name for cotton fabrics, *sindon* (σινδών), is etymologically the same as that of India or Sind; in later days Calicut on the Malabar coast has given us "Calico." Cotton cloth, whether plain or ornamented, has always been the single material of clothing for both men and women, except in Assam and Burmah, where silk is preferred, perhaps in reminiscence of an extinct trade with China. When European adventurers found the way to India, cotton and silk always formed part of the rich cargoes they brought home. The English, in especial, appear to have been careful to fix their earliest settlements amid a weaving population—at Surat, at Calicut, at Masulipatam, at Hooghly. In delicacy of texture, in purity and fastness of color, in grace of design, Indian cottons may still hold their own against the world; but in the matter of cheapness they have been unable to face the competition of Manchester.

Silk weaving is also a common industry everywhere, silk fabrics, or at least an admixture of silk in cotton, being universally affected as a mark of wealth. Throughout British Burmah, and also in Assam, silk is the common material of clothing, being made up by the women of the household. In Burmah, the bulk of the silk is imported from China, generally in a raw state; but in Assam it is obtained from two or three varieties of worms, which are generally fed on jungle trees, and may be regarded as semi-domesticated. Bengal is the only part of India where sericulture, or the rearing of the silkworm proper on mulberry, can be said to flourish. The greater part of the silk is wound in European filatures, and exported in the raw state to Europe. The native supply is either locally consumed, or sent up the Ganges to the great cities of the northwest. A considerable quantity of raw silk, especially for Bombay consumption, is imported from China. *Tasar* silk, or that obtained from the cocoons of semi-domesticated worms, does not contribute much to the supply. As compared with cotton weaving, the manufacture of silk fabrics may be called a town and not a village industry. These fabrics are of two kinds—(1) those composed of pure silk, and (2) those with a cotton warp crossed by a woof of silk. Both kinds are often embroidered with gold and silver. The mixed fabrics are known as *mashru* or *sufi*, the latter word meaning "permitted," being used because the strict ceremonial law will not allow Mahometans to wear clothing of pure silk. They are largely woven in the towns of the Punjab and Sind, at Agra, at Hyderabad in the Deccan, and at Tanjore and Trichinopoli. Pure silk fabrics are either of simple texture, or highly ornamented in the form of *kinkhabs* or brocades. The latter are a specialty of Benares, Murshidábád, Ahmadábád, and Trichinopoli. Printed silks are woven at Surat for the wear of Pársí and Guzerati women. Quite recently mills with steam machinery have been established at Bombay, which weave silk fabrics for the Burmese market, chiefly *lúngyís*, *tamains*, and *patsoes*. The silk manufactures exported from India consist almost entirely of the handkerchiefs known as *bandannas* and *corahs*, with a small proportion of *tasar* fabrics.

Embroidery has already been referred to in the two preceding paragraphs. The groundwork may be either silk, cotton, wool, or leather. The ornament is woven in the loom, or sewn on afterward with the needle. Muslin is embroidered with silk and gold thread at Dacca, Patná, and Delhi. Sind and Cutch (Kachhch) have special embroideries of colored silk and gold. Leather-work is embroidered in Guzerat. In some of the historical capitals of the Deccan, such as Gulbargah and Aurangábád, velvet (*makhmal*) is gorgeously embroidered with gold, to make canopies, umbrellas, and housings for elephants and horses, for use on state occasions. Not only the goldsmith, but also the jeweler lends his aid to Indian embroidery.

Carpets and rugs may be classified into those made of cotton and those made of wool. The former, called *satranjis* and *daris*, are made chiefly in Bengal and northern India, and appear to be an indigenous manufacture. The woolen or pile carpets known as *kalin* and *kalicha* are those which have recently attained so much popularity in England, by reason of the low price at which the out-turn of the jail manufactories can be placed in the market. The art was probably introduced into India by the Mahometans. The historical seats of the industry are in Kashmír, the Punjab, and Sind, and at Agra, Mírzápur, Jabalpur, Warangal in the Deccan, Malabar, and Masulipatam. Velvet carpets are also made at Benares and Murshidábád, and silk pile carpets at Tanjore and Salem.

Gold and silver and jewels, both from their color and their intrinsic value, have always been the favorite material of Oriental ornament. Even the hill tribes of Central India and the Himálayas have developed some skill in hammering silver into brooches and torques. Imitation of knotted grass and leaves seems to be the origin of the simplest and most common form of gold ornament, the early specimens consisting of thick gold wire twisted into bracelets, etc. A second archaic type of decoration is to be found in the chopped-gold jewelry of Guzerat. That is made of gold lumps, either solid or hollow, in the form of cubes and octahedrons, strung together on red silk. Of artistic jeweler's work, the best known examples come from Trichinopoli, Cuttack, Delhi, and Kashmír. Throughout southern India the favorite design is that known as *swámi*, in which the ornamentation consists of figures of Hindu gods in high relief, either beaten out from the surface or fixed upon it by solder or screws. The hammered *repoussé* silver work of Cutch (Kachhch), though now entirely naturalized, is said to be of Dutch origin. Similar work is done at Lucknow and Dacca. The goldsmith's art contributes largely to embroidery, as has already been mentioned. Gold and silver thread is made by being drawn out under the application of heat. The operation is performed with such nicety that one rupee's worth of silver will make a thread nearly 800 yards long. Before being used in the loom this metallic thread is generally twisted with silk.

Precious stones are lavishly used by Indian jewelers, who care less for their purity and commercial value than for the general effect produced by a blaze of splendor. "But nothing can exceed the skill, artistic feeling, and effectiveness with which gems are used in India both in jewelry proper and in the jeweled decoration of arms and jade" (Birdwood).

The chief duty of the village smith is, of course, to make the agricultural implements for his fellow-villagers. But in many towns in India, often the sites of former capitals, iron-work, especially in the manufacture of arms, still retains a high degree of artistic excellence.

The blade of the Indian *talwár* or sword is sometimes marvelously watered, and engraved with date and name, sometimes sculptured in half-relief with hunting scenes, sometimes shaped along the edge with teeth or notches like a saw. Matchlocks and other firearms are made at several towns in the Punjab and Sind, at Monghyr in Bengal, and at Vizianágaram in Madras. Chain armor, fine as lacework and said to be of Persian origin, is still manufactured in Kashmír, Rájputána, and Cutch (Kachhch). Ahmadnagar in Bombay is famous for its spearheads. Both firearms and swords are often damascened in gold, and covered with precious stones. In fact, the characteristic of Indian arms, as opposed to those of other Oriental countries, is the elaborate gold-work hammered or cut upon them and the unsparing use of gems. Damascening on iron and steel, known as *kuft*, is chiefly practiced in Kashmí, and at Guzerat and Siálkot in the Punjab. Damascening in silver, which is chiefly done upon bronze, is known as *bidari* work, from the ruined capital of Bidar in the nizam's dominions, where it is still chiefly carried on.

The village brazier manufactures the necessary vessels for domestic use. Chief among these is the *lota*, or globular bowl, universally used in ceremonial ablutions. The form of the *lota*, and even the style of ornamentation, has been handed down unaltered from the earliest times. Benares enjoys the first reputation in India for work in brass and copper. In the south, Madura and Tanjore have a similar fame; and in the west, Ahmadábád, Poona, and Násik. At Bombay itself large quantities of imported copper are wrought up by native braziers. The temple bells of India are well known for the depth and purity of their note. In many localities the braziers have a special repute either for a peculiar alloy or for a particular process of ornamentation. Silver is sometimes mixed with the brass, and in rarer cases gold. The brass or rather bell-metal ware of Murshidábád, known as *khágraí*, has more than a local reputation, owing to the large admixture of silver in it.

Pottery is made in almost every village, from the small vessels required in cooking to the large jars used for storing grain, and occasionally as floats to ferry persons across a swollen stream. But, though the industry is universal, it has hardly anywhere risen to the dignity of a fine art. Sind is the only province in India where the potter's craft is pursued with any regard to artistic considerations, and there the industry is said to have been introduced by the Mahometans. Sind pottery is of two kinds, encaustic tiles and vessels for domestic use. In both cases the colors are the same —turquoise blue, copper green, dark purple, or golden brown, under an exquisitely transparent glaze. The usual ornament is a conventional flower pattern, pricked in from paper and dusted along the pricking. The tiles, which are evidently of the same origin as those of Persia and Turkey, are chiefly to be found in the ruined mosques and tombs of the old Musalmán dynasties; but the industry still survives at the little towns of Saidpur and Bubri. Artistic pottery is made at Hyderabad, Karáchi, Tatta, and Hála, and also across the border, at Lahore and Múltán in the Punjab. The Madura pottery also deserves mention from the elegance of its form and the richness of its color. The Northwestern Provinces have, among other specialties, an elegant black ware with designs in white metal worked into its surface.

Stone sculpture is an art of the highest antiquity in India, as may be seen in some of the early memorials of Buddhism. Borrowing an impulse from their Greek exemplars, the Buddhist sculptors at the commencement of our era freed themselves from the Oriental tradition which demands only the gigantic and the grotesque, and imitated nature with some success. But with the revival of Bráhmanism Hindu sculptors again degenerated; and so far as the art can still be said to exist, it possesses a religious rather than an æsthetic interest. In the cities of Guzerat, and in other parts of India where the houses are built of wood, their fronts are ornamented with elaborate carving. Wood-carving, an important industry in Western India, is said, perhaps erroneously, to owe its origin to Dutch patronage, though the models of the carvers are evidently taken from their own temples. The favorite materials are blackwood, sandalwood, and jackwood. The supply of sandalwood comes from the forests of the Western Gháts in Kánara and Mysore, but some of the finest carving is done at Surat and Ahmadábád. Akin to sandalwood carving is the inlaying of the miscellaneous articles known as "Bombay boxes." This art is known to be of modern date, having been introduced from Shiraz in Persia toward the close of the last century. It consists of binding together in geometrical patterns strips of tin wire, sandalwood, ebony, ivory and stag's horn. At Vizagapatam, in Madras, similar articles are made of ivory and stag's horn, with scrollwork edged in to suit European taste. At Máinpuri, in the Northwestern Provinces, wooden boxes are inlaid with brass wire. The chief seats of ivory-carving are Amritsar, Benares, Murshidábád, and Travancore, where any article can be obtained to order, from a full-sized palanquin to a lady's comb. Human figures in clay, dressed to the life, are principally made at Krishnagar in Bengal, Lucknow, and Poona.

It remains to give some account of those manufactures proper, conducted by steam machinery and under European supervision, which have rapidly sprung up in certain parts of India during the past few years. These comprise cotton, jute, silk, and beer.

The first mill for the manufacture of cotton yarn and cloth by machinery worked by steam was opened at Bombay in 1854. Like the jute mills of Bengal, the cotton factories of Bombay have suffered of late years from the general depression of trade.

The jute mills of Bengal have sprung up to rival Dundee, just as Bombay competes with Manchester; but in the former case the capital is mostly supplied by Europeans. They cluster thickly around Calcutta, extending across the river into Hooghly district; and one has been planted at Sirájganj; far away up the Brahmaputra in the middle of the jute-producing country.

Brewing has recently become established as a prosperous business at the large hill stations on the Himálayas.

The steam paper-mills established in the neighborhood of Calcutta and at Bombay have almost entirely destroyed the local manufactures of paper which once existed in many parts of the country. The hand-made article, which was strong though coarse, and formed a Mahometan specialty, is now no longer used for official purposes. Besides manufacturing munitions of war, the government possesses a large leather factory at Cawnpur, which turns out saddlery, etc., of excellent quality. Indeed, leather manufactures are an important local industry in Oudh and the Northwestern Provinces, and are conducted on such a scale as to preclude the import from England, except in the case of *articles de luxe.*

MINERALS.

The Indian peninsula, with its wide area and diversified features, supplies a great store of mineral wealth, characterized both by variety and unusual richness. In utilizing this wealth, English enterprise has met with many rebuffs. Much capital has been expended with no other result in many cases than disappointment. But the experience has not been thrown away; and the mining industry, now established on a sure basis, is rising into an important position in a country which ought gladly to welcome any employment other than the universal pursuit of agriculture.

In the purity of ore, and in the antiquity of working, the iron deposits of India probably rank first in the world. They are to be found in every part of the country, from the northern mountains of Assam and Kumáun to the extreme south of the Madras presidency. Wherever there are hills, iron is found and worked to a greater or less extent.

Coal has been known to exist in India since 1774, and is said to have been worked as far back as 1775. There are now altogether fifty eight collieries in the country, with an annual out-turn of about one million tons.

Salt, an article of supreme necessity to the Indian peasant, who eats no meat, is derived from three main sources, exclusive of importation from Europe:—(1) by evaporation from sea-water along the entire double line of seaboard from Bombay to Orissa, but especially in Guzerat and on the Coromandel coast; (2) by evaporation from inland lakes, of which the Sámbhar Lake in Rájputána affords the chief example; (3) by quarrying solid hills of salt in the northeast of the Punjab. The last is the only case in which salt can be said to exist as a mineral. It occurs in solid cliffs, which for extent and purity are stated to have no rival elsewhere in the world.

At one time India had almost a monopoly of the supply of saltpeter upon which Europe then depended for its gunpowder. In combination with other saline substances it occurs as a white efflorescence upon the surface of the soil in many parts of the country, especially in the upper valley of the Ganges. Its preparation leaves common salt as one of the residuary products; and consequently fiscal reasons have tended to limit the manufacture to the most remunerative region, which is found in North Behar.

Gold exists in many parts and probably in considerable quantities. Herodotus affirms that the Indians were the only nation who paid their tribute to Darius in gold; and there is some reason for believing that the "Ophir" of King Solomon is to be identified with the Malabar coast. Nearly every hill stream is washed for gold, whether in the extreme south, in the central plateau, or on the northeast and northwest frontiers. It is true that gold-washing is everywhere a miserable business, affording the barest livelihood; but yet the total amount of gold obtained in this way cannot be insignificant. In recent years attention has been prominently drawn to the possibility of extracting gold from the quartz formation of southern India, which bears many points of resemblance to the auriferous quartz reefs of Australia. The principal localities are in the Wainád (Wynaad) subdivision of the Nílgiri district and in Kolár district of Mysore. Gold-washing has always been practiced there; and the remains of old workings show that at some unknown period operations have been conducted on a large scale.

Copper is known to exist in many parts of the country in considerable quantities. The richest mines are in the lower ranges of the Himálayas, from Dárjíling westward to Kumáun. The ore occurs in the form of copper pyrites, often accompanied by mundic, not in true lodes, but disseminated through the slate and schist.

Lead occurs in the form of sulphuret or galena along the Himálayas on the Punjab frontier, and has been worked at one place by an English company.

Tin is confined to the Burmese peninsula. Very rich deposits, yielding about 70 per cent. of metal, occur over a large extent of country in Mergui and Tavoy districts of the Tenasserim region. The ore is washed and smelted, usually by Chinese, in a very rough and unscientific way. Recent experiments made by a European firm seem to show that the deposits, though rich and extensive, are not sufficiently deep to repay more elaborate processes.

Antimony, in the form of *surmá*, which is largely used by the natives as a cosmetic, is chiefly derived from the hill states of the Punjab. It is also found in Mysore and Burmah. The minerals of Rájputána, which have not yet been thoroughly ascertained, include an ore of cobalt used for coloring enamel.

Petroleum is produced chiefly in Independent Burmah, but it has also been found on British territory in Pegu, in Assam, and in the Punjab.

The commonest and also the most useful kind of stone of India is *kankar*, a nodular form of impure lime, which is found in almost every river valley, and is used universally for metaling the roads. Lime for building is derived from two sources—(1) from burning limestone and *kankar*, and (2) from the little shells so abundantly found in the marshes. Calcutta derives its chief supply from the quarries of the Khásí hills in Assam, known as "Sylhet lime," and from the Susunia quarries in Bankura district. The Gangetic delta is destitute of stone, nor does the alluvial soil afford good materials for brick-making or pottery. But a European firm has recently established large pottery-works at Ráníganj in Bardwán, which employ about five hundred hands, and carry out contracts for drainage pipes and stoneware. The center of the peninsula and the hill country generally abound in building-stone of excellent quality, which has been used locally from time immemorial. Among the finest stones may be mentioned the pink marble of Rájputána, of which the historical buildings at Agra were constructed, the trap of the Deccan, the sandstone of the Godávari and the Narbadá, and the granite of southern India. Quarries of slate are scattered through the peninsula, and are sometimes worked by European capital. Mica and talc are also quarried to make ornaments. Among the hills of Orissa and Chutiá Nágpur household vessels and ornaments are skillfully carved out of an indurated variety of potstone.

Notwithstanding its legendary wealth, which is really due to the accumulations of many ages, India cannot be said to be naturally rich in precious stones. Under the Mahometan rule diamonds were a distinct source of state revenue; and Akbar is said to have received a royalty of £80,000 a year from the mines of Panna. But at the present day the search for them, if carried on anywhere in British territory, is an insignificant occupation. At the present day the only place where the search for diamonds is pursued as a regular industry is the native state of Panna (Punnah) in Bundelkhand. The stones are found by digging down through several strata of gravelly soil and washing the earth. Even there, however, the pursuit is understood to be unremunerative, and has failed to attract European capital. About other gems little information is available.

ADMINISTRATION.

The supreme authority over all British India, both for executive and legislative purposes, is vested by a series of acts of Parliament in the viceroy or governor-general-in-council, subject to the ultimate sanction of the secretary of state in England. Every executive order and every legislative statute runs in the name of the "Governor-General-in-Council;" but in certain exceptional classes of cases a power is reserved to the viceroy to act independently of his council. This council is twofold. First, there is the ordinary or executive council, usually composed of about six official members besides the viceroy, which may be compared with the cabinet of a constitutional country. It meets regularly at short intervals, discusses and decides upon questions of foreign policy and domestic administration, and prepares measures for the legislative council. Its members divide among themselves the chief departments of state, such as those of foreign affairs, finance, war, public works, etc.; while the viceroy combines in his own person the duties both of constitutional sovereign and prime minister. Secondly, there is the legislative council, which is constituted by the same members as the preceding, with the addition of the governor of the province in which it may be held, and official delegates from Madras and Bombay, together with certain nominated members representing the non-official native and European communities. The meetings of the legislative council are held when and as required. They are open to the public; and a further guarantee for publicity is insured by the proviso that draft bills must be published a certain number of times in the *Gazette.* As a matter of practice, these draft bills have usually been first subjected to the criticism of the several provincial governments. In regard to the supreme judicial authority there is no such uniform system. The presidencies of Madras and Bombay, and also two of the three great provinces which have been created out of the old presidency of Bengal, and are now known as the lieutenant-governorships of Bengal and the Northwestern Provinces, have each a high court, supreme both in civil and criminal business, with an ultimate appeal to the judicial committee of the privy council in England. Of the subordinate provinces, the Punjab has a chief court, with three judges; the Central Provinces, Oudh, and Berar have each a judicial commissioner, who sits alone; while in Assam and British Burmah the chief commissioner, or supreme executive officer, is also the highest judicial authority.

The law administered in the Indian courts consists mainly of (1) the enactments of the Indian legislative councils above described and of the bodies which preceded them; (2) statutes of the British parliament which apply to India; (3) the Hindu and Mahometan laws on domestic inheritance or other cases affecting the Hindus and Mahometans, and (4) the customary law affecting particular castes and races. Much has been done toward consolidating individual sections of the Indian law; and in the Indian penal code, together with the codes of civil and criminal procedure, we have memorable examples of such efforts.

But, though the governor-general-in-council is theoretically supreme over every part of India alike, his actual authority is not everywhere exercised in the same direct manner. For ordinary purposes of administration British India is partitioned into provinces, each with a government of its own; and certain of the native states are attached to those provinces with which they are most nearly connected geographically. These provinces, again, enjoy various degrees of independence, in accordance with the course of their historical development. The two sister presidencies of Madras and Bombay still retain many marks of their original equality with Bengal. They each have an army and a civil service of their own. They are each administered by a governor appointed direct from England, with an executive and a legislative council, whose functions are analogous to those of the councils of the governor-general. They thus possess a domestic legislature; and in administrative matters, also, the interference of the viceroy is a somewhat remote contingency. Of the other provinces, Bengal, or rather Lower Bengal, occupies a peculiar position. Like the Northwestern Provinces and the Punjab, it is administered by a single official, with the style of lieutenant-governor, who is controlled by no executive council; but, unlike those two provinces, Bengal has a legislative council, so far preserving a sign of its early preëminence. The remaining provinces, whether ruled by a lieutenant-governor or by a chief commissioner, may be regarded from an historical point of view as fragments of the original Bengal presidency, which as thus defined would be coëxtensive with all British India that is not appropriated either to Madras or to Bombay. The lieutenant-governors and most of the chief commissioners are chosen from the covenanted civil service. In executive matters they are the practical rulers; but, excepting the lieutenant-governor of Bengal, they have no legislative authority. To complete the total area of territory under British administration, it is necessary to add certain *quasi*-provinces, under the immediate control of the viceroy. These consist of Ajmír (Ajmere), transferred from Rájputána; Berar, or the districts assigned by the nizám of Hyderabad; the state of Mysore, which was restored in 1881 upon terms to its native rájáh; and the tiny territory of Coorg, in the extreme south.

Another difference of administration, though now of less importance than in former times, derives its name from the old regulations, or uniform rules of law and practice which preceded the present system of acts of the legislature. These regulations, originally intended to be universal in their application, have been from time to time withdrawn so far as regards certain tracts of country which from their backward state of civilization or other causes seemed to require exceptional treatment. In non-regulation territory, broadly speaking, a larger measure of discretion is allowed to the officials, both in the collection of revenue and in the administration of civil justice; strict rules of procedure yield to the necessities of the case, and the judicial and executive departments are to a great extent combined in the same hands. Closely connected with this indulgence in favor of the personal element in administration, a wider field is also permitted for the selection of the administrative staff, which is not confined to the covenanted civil service, but includes military officers on the staff and also uncovenanted civilians. The title of the highest authority in a non-regulation district is not that of collector-magistrate, but deputy commissioner; and the supreme authority in a non-regulation province is usually styled, not lieutenant-governor, but chief commissioner. The Central Provinces and British Burmah are examples of non-regulation provinces; but non-regulation districts are to be found also in Bengal and the Northwestern Provinces, where their existence can always be traced by the office of deputy commissioner.

Alike in regulation and in non-regulation territory the unit of administration is the district—a word of very definite meaning in official phraseology. The district officer, whether known as collector-magistrate or as deputy commissioner, is the sole responsible head of his jurisdiction.

Upon his energy and character rests ultimately the efficiency of the Indian Government. Not only are his own special duties so numerous and so vast as to be bewildering to the outsider, but the work of his subordinates, European and native, largely depends upon the stimulus of his personal example. His position has been compared to that of the French *préfet;* but such a comparison is unjust in many ways to the Indian district officer: he is not a creature of the Home Office, who takes his color from his chief and represents only officialism, but an active worker in every department of popular well-being, with a large measure of individual initiative. As the very name of collector-magistrate implies, his main functions are twofold. He is a fiscal officer, charged with the collection of the revenue from land and other sources; and he is a civil and criminal judge of first instance. But this explanation of his title by no means exhausts his multifarious duties. He does in his local sphere all that the home secretary is supposed to do in England, and a great deal more; for he is the representative of a paternal and not of a constitutional government. Police, jails, education, municipalities, roads, sanitation, dispensaries, are all to him matters of daily concern, while, in addition, he is expected to make himself acquainted with every phase of the social life of the natives and with each natural aspect of the country. Besides being a lawyer, an accountant, and a clerk, he ought also to possess no mean knowledge of agriculture, political economy, and engineering.

The total number of districts in British India is 250. They vary greatly in size and in number of inhabitants. The average area is 3,778 square miles, ranging from an average of 6,612 square miles in Madras to an average of 1,999 square miles in Oudh. The average population is 802,927, similarly ranging from an average of 1,508,219 in Madras to an average of 161,597 in Burmah. The Madras districts are thus both the largest and the most populous. In every province but Madras, the districts are grouped into larger areas, known as divisions, each under the charge of a commissioner. But these divisions are not properly units of administration, as the districts are. They are aggregates of units, formed only for convenience of supervision, so that an intermediate authority may exercise the universal watchfulness which would be impossible for a distant lieutenant-governor. The districts are again partitioned out into lesser tracts, which are strictly units of administration, though subordinate ones. The system of partitioning, and also the nomenclature, vary in the different provinces; but generally it may be said that the subdivision or *tahsíl* is the ultimate unit of administration. The double name indicates the twofold principle of separation: the subdivision is properly the charge of an assistant magistrate or executive officer, the *tahsíl* is the charge of a deputy-collector or fiscal officer; and these two offices may or may not be in the same hands. Broadly speaking, the subdivision is characteristic of Bengal, where revenue duties are in the background, and the *tahsíl* of Madras, where the land settlement requires attention year by year. There is no administrative unit below the subdivision or *tahsíl.* The *thánâ*, or police division, only exists for police purposes. The *pargană*, or fiscal division under native rule, has now but an historical interest. The village still remains as the agricultural unit, and preserves its independence for revenue purposes in certain parts of the country. The township is peculiar to Burmah.

The judicial jurisdictions coincide for the most part with the magisterial and fiscal boundaries. But, except in Madras, where the districts are large, a single civil and sessions judge, *i. e.*, the supreme judicial officer under the high court, sometimes exercises jurisdiction over more than one district. As has been already mentioned, in non-regulation territory judicial and executive functions are combined in the same hands.

The preceding sketch of Indian administration would be incomplete without a reference to the secretariat, or central office, which in some sense controls and gives life to the whole. From the secretariat are issued the orders which regulate or modify the details of administration; into the secretariat come all the multifarious reports from the local officers, to be there digested for future reference. But though the secretaries may enjoy the advantages of life at the presidency capitals, with higher salaries and better prospects of promotion, it is recognized that the efficiency of the empire rests ultimately upon the shoulders of the district officers, who bear the burden and heat of the day, with few opportunities of winning fame or reward.

The existing system of education in India is mainly dependent upon the government, being directly organized by the state, at least in its higher departments, assisted throughout by grants-in-aid, and under careful inspection. The present system dates from 1854, being based upon a comprehensive dispatch sent out by Sir C. Wood (afterward Lord Halifax) in that year. At that time the three universities were founded at Calcutta, Madras, and Bombay; English-teaching schools were established in every district; the benefit of grants-in-aid was extended to the lower vernacular institutions and to girls' schools; and public instruction was erected into a department of the administration in every province, under a director, with a staff of inspectors. In some respects this scheme may have been in advance of the time; but it supplied a definite outline, which has gradually been filled up with each succeeding year of progress. A network of schools has now been spread over the country, graduated from the indigenous village institutions up to the highest colleges. All alike receive some measure of pecuniary support, which is justified by the guarantee of regular inspection; and a series of scholarships at once stimulates efficiency and opens a path to the university for children of the poor.

HISTORY.

Our earliest glimpses of India disclose two races struggling for the soil. The one was a fair-skinned people, who had lately entered by the northwestern passes—a people of Aryan (literally "noble") lineage, speaking a stately language, worshiping friendly and powerful gods. The other was a race of a lower type, who had long dwelt in the land, and whom the lordly new-comers drove back before them into the mountains, or reduced to servitude on the plains. The comparatively pure descendants of these two races in India are now nearly equal in number, there being about eighteen millions of each; their mixed progeny, sprung chiefly from the ruder stock, make up the mass of the present Indian population.

The struggle is commemorated by the two names which the victors gave to the early tribes, namely, the Dasyus, or "enemies," and the Dásas, or "slaves." The last remains to this day the family name of multitudes of the lower class in Bengal.

Thrust back by the Aryans from the plains, these primitive peoples have lain hidden away in the recesses of the mountains, like the remains of extinct animals which zoölogists find in hill-caves. India thus forms a great museum of races, in which we can study man from his lowest to his highest stages of culture.

India may be divided into three regions. Two of these, the Himálayas in the north and the three-sided table-land in the south, still form the retreats of the non-Aryan tribes. The third, or the great river plains, became in very ancient times the theater on which a nobler race worked out its civilization.

We know little regarding these noble Aryan tribes in their early camping-ground in Central Asia. From words preserved in the languages of their long-separated descendants in Europe and India, scholars infer that they roamed over the grassy steppes with their cattle, making long halts to raise crops of grain. They had tamed most of the domestic animals, were acquainted with some metals, understood the arts of weaving and sewing, wore clothes, and ate cooked food. They lived the hardy life of the temperate zone, and the feeling of cold seems to be one of the earliest common remembrances of the eastern and western branches of the race. Ages afterward, when the Vedic singers in hot India prayed for long life, they asked for "a hundred *winters*." The forefathers of the Greek and the Roman, of the Englishman and the Hindu, dwelt together in Asia, spoke the same tongue, worshiped the same gods. The languages of Europe and India, although at first sight they seem wide apart, are merely different forms of the original Aryan speech. This is especially true of the common words of family life. The names for *father*, *mother*, *brother*, *sister*, and *widow* are the same in most of the Aryan languages, whether spoken on the banks of the Ganges, of the Tiber, or of the Thames. Thus the word *daughter*, which occurs in nearly all of them, has been derived from two Sanskrit roots meaning "to draw milk," and preserves the memory of the time when the daughter was the little milkmaid in the primitive Aryan household.

The *Rig-Veda* forms the great literary memorial of the early Aryan settlements in the Punjab. The age of this venerable hymnal is unknown. The Hindus believe, without evidence, that it existed "from before all time," or at least 3,001 years B.C., nearly 5,000 years ago. European scholars have inferred from astronomical dates that its composition was going on about 1400 B.C. But these dates are themselves given in writings of later origin, and might have been calculated backward. We only know that the Vedic religion had been at work long before the rise of Buddhism in the sixth century B.C. The race progressed from a loose confederacy of tribes into several well-knit nations, each bound together by the strong central force of kingly power, directed by a powerful priesthood and organized on a firm basis of caste.

Certain families came to have, not only an herditary claim to conduct the great sacrifices, but also the exclusive knowledge of the ancient hymns, or at any rate of the traditions which explained their symbolical meaning. They naturally tried to render the ceremonies solemn and imposing. By degrees a vast array of ministrants grew up around each of the greater sacrifices. There were first the officiating priests and their assistants, who prepared the sacrificial ground, dressed the altar, slew the victims, and poured out the libations; second, the chanters of the Vedic hymns; third, the reciters of other parts of the service; fourth, the superior priests, who watched over the whole, and corrected any mistakes.

Meanwhile other castes had been gradually formed. As the Aryans moved eastward from the Indus, some of the warriors were more fortunate than others, or received larger shares of the conquered lands. Such families had not to till their fields with their own hands, but could leave that work to be done by the aboriginal races whom they subdued. In this way there grew up a class of warriors, freed from the labor of husbandry, who surrounded the chief or king, and were always ready for battle. It seems likely that these kinsmen and "companions of the king" formed an important class among the early Aryan tribes in India, as they certainly did among the ancient branches of the race in Europe, and still do at the petty courts of India. Their old Sanskrit names, *Kshattriya*, *Rájanya*, and *Rájbansi*, mean "connected with the royal power," or "of the royal line;" their usual modern name *Rájput* means "of royal descent." In process of time, when the Aryans settled down, not as mere fighting clans, but as powerful nations, in the middle land along the Jumna and Ganges, this warrior class grew in numbers and in power. The black races had been reduced to serfdom, or driven back into the Himálayas and the Vindhyás, on the north and the south of that fertile tract. The incessant fighting, which had formed the common lot of the tribes on their actual migration eastward from the Indus, ceased. A section of the people laid aside their arms, and devoted themselves to agriculture or other peaceful pursuits. The sultry heats of the Middle Land must also have abated their old northern energy, and led them to love repose. Those who, from family ties or from personal inclination, preferred a soldier's life had to go beyond the frontier to find an enemy. Distant expeditions of this sort could be undertaken much less conveniently by the husbandman than in the ancient time, when his fields lay on the very border of the enemy's country, and had just been wrested from it. Such expeditions required and developed a class of regular soldiers whose presence was not constantly needed at home for tilling the land. The old warrior companions and kinsmen of the king formed a nucleus round which gathered all the more daring spirits, and laid the foundation of a military caste. The Aryans on the Ganges, in the "Middle Land," thus found themselves divided into three classes—first, the priests, or Bráhmans; second, the warriors and king's companions, called in ancient times Kshattriyas, at the present day Rájputs; third, the husbandmen, or agricultural settlers, who retained the old name of Vaisyas, from the root *vis*, which in the Vedic period had included the whole "people." These three classes gradually became distinct castes; intermarriage between them ceased, and each kept more and more strictly to its hereditary employment. But they were all recognized as belonging to the "twice-born" or Aryan race, were all present at the great national sacrifices, and all worshiped the same bright gods. Beneath them was a fourth or servile class, called Súdras, the remnants of the vanquished aboriginal tribes whose lives had been spared. These were "the slave-bands of black descent," the Dásas of the *Veda*.

The Súdras had no rights, and, once conquered, ceased to struggle against their fate. But a long contest raged between the priests and warriors for the chief place in the Aryan commonwealth.

In order to understand that contest, we must go back to the time when the priests and warriors were simply fellow-tribesmen. The priestly or Bráhman caste grew slowly out of the families of Rishis who composed the Vedic hymns, or were chosen to conduct the great tribal sacrifices. In after times the whole Bráhman population of India pretended to trace their descent from seven Rishis. But the composers of the Vedic hymns were sometimes kings or distinguished warriors rather than priests; the *Veda* itself speaks of these royal Rishis (*Rájarshis*). When the Bráhmans put forward their claim to the highest rank, the warriors or Kshattriyas were slow to admit it; and, when the Bráhmans went a step farther, and declared that only members of their families could be priests, or gain admission into the priestly caste, the warriors disputed their pretensions. In later ages the Bráhmans, having the exclusive keeping of the sacred writings, effaced from them, as far as possible, all traces of the struggle. They taught that their caste had come forth from the mouth of God, divinely appointed to the priesthood from the beginning of time. Nevertheless, a large body of Vedic verses and Sanskrit texts has now been brought to bear upon the struggle between the Bráhmans and Kshattriyas for the highest rank.

The Bráhmans were not merely the depositaries of the sacred books, the philosophy, the science, and the laws of the ancient Hindu commonwealth; they were also the creators and custodians of its secular literature. They had a practical monopoly of Vedic learning, and their policy was to trace back every branch of knowledge and intellectual effort to the *Veda*.

In order to understand the long domination of the Bráhmans and the influence which they still wield, it is necessary to keep in mind their position as the great literary caste. Their priestly supremacy has been repeatedly assailed, and was during a space of several hundred years overthrown. But throughout twenty-two centuries they have been the counselors of Hindu princes and the teachers of the Hindu people. They represent the early Aryan civilization of India; and the essential history of the Hindus is a narrative of the attacks upon the continuity of that civilization—that is to say, of attacks upon the Bráhmanical system of the Middle Land, and of the modifications and compromises to which that system has had to submit. Those attacks range themselves under six epochs: first, the religious uprising of the half-Bráhmanized Aryan tribes on the east of the Middle Land, initiated by the preaching of Buddha in the sixth century B.C., culminating in the Buddhist kingdoms about the commencement of our era, and melting into modern Hinduism about the eighth century A.D.; second, warlike inroads of non-Bráhmanical Aryans or other races from the west, commencing with the Greek invasions in the fourth century B.C., and continuing under the Græco-Bactrian empire and its successors to probably the third or fifth century A.D.; third, the influence of the non-Aryan tribes of India and of the non-Aryan low-castes incorporated from them—an influence ever at work, indeed by far the most powerful agent in dissolving Bráhmanism into Hinduism, but represented in a special manner by the non-Aryan kingdoms about the seventh and eighth centuries A.D.; fourth, the reaction against the low beliefs, priestly oppression, and bloody rites which resulted from this compromise between Bráhmanism and aboriginal worship, a reaction which received an impetus from the preaching of Sankar-Achárjya, who founded a philosophical Siviate sect in the eighth or ninth century, and received its full development under a line of great Vishnuvite reformers from the twelfth to the sixteenth centuries A.D.; fifth, Mahometan invasions and the rule of Islám, 1000 to 1765 A.D.; sixth, the English supremacy, and the great popular upheaval which it has produced in the eighteenth and nineteenth centuries.

Buddhist Period.

The first great solvent of Bráhmanism was the teaching of Buddha. The life of this celebrated man has three sides—its personal aspects, its legendary developments, and its religious consequences upon mankind. In his own person Buddha appears as a prince and preacher of ancient India. In the legendary developments of history Buddha ranks as a divine teacher among his followers, as an incarnation of Vishnu among the Hindus, and apparently as a saint of the Christian church, with a day assigned to him in both the Greek and Roman calendars. As a religious founder he left behind him a system of beliefs which has gained more disciples than any other creed in the world, and which, after a lapse of twenty-four centuries, is now professed by 500,000,000 of people, or more than one-third of the human race. The life of Buddha is related a length under BUDDHISM.

Buddhism never ousted Bráhmanism from any large part of India. The two systems coëxisted as popular religions during more than 1,000 years (244 B.C. to about 800 A.D.), and modern Hinduism is the joint product of both.

Greek-Roman Period.

The external history of India commences with the Greek invasion in 327 B.C. Alexander the Great entered India early in 327 B.C., crossed the Indus above Attock, and advanced, without a struggle, over the intervening territory of the Taxiles to the Jhelum (Hydaspes). He found the Punjab divided into petty kingdoms, jealous of each other, and most of them inclined to join an invader rather than to oppose him. One of these local monarchs, Porus, disputed the passage of the Jhelum. His son fell early in the onset;

Porus himself fled, wounded, but, on tendering his submission, was confirmed in his kingdom, and became the conqueror's trusted friend.

Alexander built two memorial cities on the scene of his victory—Bucephalia on the west bank, near the modern Jalálpur, named after his beloved charger slain in the battle, and Nicæa, the present Mong, on the east side of the river.

Alexander advanced southeast through the kingdom of the younger Porus to Amritsar, and, after a sharp bend backward to the west, to fight the Cathæi at Sangala, he reached the Beas (Hyphasis). There, at a spot not far from the modern battlefield of Sobráon, he halted his victorious standards. He had resolved to march to the Ganges; but his troops were worn out by the heats of the Punjab summer, and their spirits broken by the hurricanes of the southwest monsoon. The native tribes had already risen in his rear, and the conqueror of the world was forced to turn back before he had crossed even the frontier province of India. The Sutlej, the eastern districts of the Punjab, and the mighty Jumna still lay between him and the Ganges. A single defeat might be fatal to his army; if the battle on the Jhelum had not gone in his favor, not a Greek would have reached the Afghán side of the passes. Yielding at length to the clamor of his troops, he led them back to the Jhelum. He there embarked 8,000 of them in boats previously prepared, and floated down the river; the remainder of his army marched in two divisions along the banks.

The country was hostile, and the Greeks held only the land on which they encamped. At Múltán (Mooltan), then as now the capital of the southern Punjab, he had to fight a pitched battle with the Malli, and was severely wounded in taking the city. His enraged troops put every soul within it to the sword. Farther down, near the confluence of the five rivers of the Punjab, he made a long halt, built a town—Alexandria, the modern Uchch—and received the submission of the neighboring states. A Greek garrison and satrap, left there by Alexander, laid the foundation of a lasting influence. Having constructed a new fleet suitable for the greater rivers on which he was now to embark, he proceeded southward through Sind, and followed the course of the Indus until he reached the ocean. In the apex of the delta he founded a city, Patala, which remains to this day under the name of Hyderabad, the capital of Sind. At the mouth of the Indus Alexander beheld for the first time the majestic phenomenon of the tides. One part of his army he shipped off under the command of Nearchus to coast along the Persian Gulf; the other he himself led through southern Baluchistán and Persia to Susa, where, after terrible losses from want of water and famine on the march, he arrived in 325 B.C.

During his two years' campaign in the Punjab and Sind, Alexander captured no province, but he made alliances, founded cities and planted garrisons. He had transferred much territory to chiefs and confederacies devoted to his cause; every petty court had its Greek faction; and the detachments which he left behind at various positions, from the Afghán frontier to the Beas, and from near the base of the Himálayas to the Sind delta, were visible pledges of his return. At Taxila (Deri-Shahan) and Nicæa (Mong) in the northern Punjab, at Alexandria (Uchch) in the southern Punjab, at Patala (Hyderabad) in Sind, and at other points along his route, he established military settlements of Greeks or allies. A large body of his troops remained in Bactria; and, in the partition of the empire which followed Alexander's death in 323 B.C., Bactria and India eventually fell to Seleucus Nicator, the founder of the Syrian monarchy.

Meanwhile a new power had arisen in India. Among the Indian adventurers who thronged Alexander's camp in the Punjab, each with his plot for winning a kingdom or crushing a rival, Chandra Gupta, an exile from the Gangetic valley, seems to have played a somewhat ignominious part. He tried to tempt the wearied Greeks on the banks of the Beas with schemes of conquest in the rich southeastern provinces; but, having personally offended their leader, he had to fly the camp, (326 B.C.) In the confused years which followed, he managed, with the aid of plundering hordes, to form a kingdom on the ruins of the Nanda dynasty in Magadha, or Behar, (316 B.C.) He seized the capital, Pataliputra, the modern Patná, established himself firmly in the Gangetic valley, and compelled the northwestern principalities, Greeks and natives alike, to acknowledge his suzerainty. While, therefore, Seleucus was winning his way to the Syrian monarchy during the eleven years which followed Alexander's death, Chandra Gupta was building up an empire in northern India. Seleucus reigned in Syria from 312 to 280 B.C., Chandra Gupta in the Gangetic valley from 316 to 292 B.C. In 312 B.C. the power of both had been consolidated, and the two new sovereignties were soon brought face to face.

Scythic and Non-Aryan Influences.

About 126 B.C. the Tartar tribe of Su is said to have driven out the Greek dynasty from Bactria, and the Græco-Bactrian settlements in the Punjab were overthrown by the Tue-Chi. The Scythian migrations toward India culminated in the empire of Kanishka, who held the fourth Buddhist council, *circa* 40 A.D., and practically became the royal founder of northern Buddhism. The Scythic element played an important part in the history of northern India. Under Kanishka and his successors a connection was established with the Buddhist nations of central and eastern Asia, traces of which survived to the time of Hwen Tsang (629–645 A.D.) in the name of China-pati, about ten miles to the west of the Beas river. China-pati is said to have been the town whish Kanishka appointed for the residence of his Chinese hostages.

An effort has been made to trace Buddha himself to a Scythic origin. Whatever may be the value of this conjecture, the influence of the Scythian dynasties in northern India is an historical fact. The northern or Tibetan form of Buddhism, represented by Kanishka and his council in 40 A.D., made its way down to the plains of Hindustán, and, during the next six centuries, competed with the earlier Buddhism of Asoka. Many scholars believe that the Scythians poured down upon India in such masses as to supplant the previous population.

The Scythic settlement was not effected without a struggle. As Chandra Gupta advanced from the Gangetic valley, and rolled back the tide of Græco-Bactrian conquest (*circa* 312–306 B.C.), so the Indian heroes of the first century before and after Christ are native princes who stemmed the torrent of Scythian invasion. Vikramáditya, king of Ujjain, won his paramount place in Indian story by driving out the invaders.

Mahometan Period.

At the very time that Buddhism was being crushed out of India by the Bráhmanic reaction, a new faith was being born in Arabia, destined to supply a youthful fanaticism which should sweep the country from the Himálayas to Cape Comorin, and from the western to the eastern sea. Muhammad, commonly known as Mahomet, the founder of Islám, died at Medina in 632 A.D., while the Chinese pilgrim Hwen Tsang was still on his travels. The first Mahometan invasion of India is placed in 664, only thirty-two years after the death of the prophet. The Punjab is said to have been ravaged on this occasion with no permanent results. The first Mahometan conquest was the outlying province of Sind, which from the point of view of geology may be regarded as a continuation of the desert of Baluchistán. In 711, or seventy-nine years after the death of Mahomet, an Arab army under Muhammad Kásim invaded and conquered the Hindus of Sind in the name of Walid I., caliph of Damascus, of the Bene-Umyyeh line. In the same year Roderic, the last of the Goths, fell before the victorious Saracens in Spain But in India the bravery of the Rájputs and the devotion of the Bráhmans seem to have afforded a stronger national bulwark than existed in western Europe. In 750 the Hindus rose in rebellion and drove out the Musalmán tyrant, and the land had rest for 150 years.

The next Mahometan invasion of India is associated with the name of Sultán Mahmúd of Ghazní. Mahmúd was the eldest son of Sabuktagín, surnamed Nasr-ud-dín, in origin a Turkish slave, who had established his rule over the greater part of modern Afghánistán and Khorasán with Ghazní as his capital. In 977 Sabuktagín is said to have defeated Jáipal, the Hindu rájáh of Lahore, and to have rendered the Punjab tributary. But his son Mahmúd was the first of the great Musalmán conquerors whose names still ring through Asia. Mahmúd succeeded to the throne in 997. During his reign of thirty-three years he extended the limits of his father's kingdom from Persia on the east to the Ganges on the west; and it is related that he led his armies into the plains of India no less than seventeen times. In 1001 he defeated Rájáh Jáipal a second time, and took him prisoner. But Anandpal, the son of Jáipal, raised again the standard of national independence, and gathered an army of Rájput allies from the farthest corners of Hindustán. The decisive battle was fought in the valley of Peshávar. Mahmúd won the day by the aid of his Turkish horsemen, and thenceforth the Punjab has been a Mahometan province, except during the brief period of Síkh supremacy.

The Afghans of Ghor or Ghur rose to power on the downfall of the Turks of Ghazní. The founder of the family is said to have been Izzud-dín al Husáin, whose son Allah-ud-dín destroyed Ghazní. Allah-ud-dín had two nephews, Ghíyás-ud-dín and Muiz-ud-dín, the latter of whom, also called Shahab-ud-dín by Musalmán chroniclers, and generally known in history as Muhammad Ghori, is the second of the great Mahometan conquerors of India. In 1176 he took Múltán and Uchch; in 1187 Lahore fell into his hands; in 1191 he was repulsed before Delhi, but soon afterward he redeemed this disaster. Hindustán Proper was at that period divided between the two Rájput kingdoms of Kanauj and Delhi. Muhammad Ghori achieved his object by playing off the rival kings against each other. By 1193 he had extended his conquests as far east as Benares, and the defeated Rájputs migrated in a body to the hills and deserts now known as Rájputána. In 1199 one of his lieutenants, named Bakhtiyar, advanced into Bengal, and expelled by an audacious stratagem the last Hindu rájáh of Nadiyá. The entire northern plain, from the Indus to the Brahmaputra, thus lay under the Mahometan yoke. But Muhammad Ghori never settled himself permanently in India. His favorite residence is said to have been the old capital of Ghazní, while he governed his Indian conquests through the agency of a favorite slave, Kutab-ud-dín. Muhammad Ghori died in 1206, being assassinated by some Ghakkar tribesmen while sleeping in his tent by the bank of the Indus; on his death both Ghor and Ghazní drop out of history, and Delhi first appears as the Mahometan capital of India.

On the death of Muhammad Ghori, Kutab-ud-dín at once laid aside the title of viceroy, and proclaimed himself sultán of Delhi. He was the founder of what is known as the slave dynasty, which lasted for nearly a century (1206–1288).

In 1294 Allah-ud-dín Khiljí, the third of the great Mahometan conquerors of India, raised himself to the throne of Delhi by the treacherous assassination of his uncle Firoz II., who had himself supplanted the last of the slave dynasty. Allah-ud-dín died in 1316, having subjected to Islám the Deccan and Guzerat. Three of his descendants followed him upon the throne, but their united reigns extended over only five years. In 1321 a successful revolt was headed by Ghiyas-ud-dín Tughlak, governor of the Punjab, who is said to have been of Turkish origin. The Tughlak dynasty lasted for about seventy years, until it was swept away by the invasion of Timúr, the fourth Mahometan conqueror of India, in 1398.

When Timúr invaded India in 1398, he encountered but little organized resistance. Mahmúd, the last of the Tughlak dynasty, being defeated in a battle outside the walls of Delhi, fled into Guzerat. The city was sacked and the inhabitants massacred by the victorious Mughals. But the invasion of Timúr left no permanent impress upon the history of India, except in so far as its memory fired the imagination of Bábar (Baber), the founder of the Mughal dynasty.

In 1525 Bábar (Baber), the fifth in descent from Timúr, and also the fifth Mahometan conqueror, invaded India at the instigation of the governor of the Punjab, won the victory of Pánipat over Ibráhim, the last of the Lodi dynasty, and founded the Mughal empire, which lasted, at least in name, until 1857.

In 1739 Nádir Sháh of Persia, the sixth and last of the great Mahometan conquerors of India, swept like a whirlwind over Hindustán, and sacked the imperial city of Delhi. Thenceforth the Great Mughal (Mogul) became a mere name, though the hereditary succession continued unbroken down to our own day. Real power had passed into the hands of Mahometan courtiers and Marhattá generals, both of whom were then carving for themselves kingdoms out of the dismembered empire, until at last British authority placed itself supreme over all.

Early European Settlements.

Mahometan invaders have always entered India from the northwest. Her new conquerors approached from the sea and from the south. In 1492 Christopher Columbus set sail under the Spanish flag to seek India beyond the Atlantic, bearing with him a letter to the great khan of Tartary. The expedition under Vasco da Gama started from Lisbon five years later, and, doubling the Cape of Good Hope, cast anchor off the city of Calicut on May 20, 1498, after a prolonged voyage of nearly eleven months.

After staying nearly six months on the Malabar coast, Da Gama returned to Europe by the same route as he had come. If the West Indies belonged to Spain by priority of discovery, Portugal might claim the East Indies by the same right. Territorial ambition conspired with the spirit of proselytism and with the greed of commerce to fill all Portuguese minds with the dream of a mighty Oriental empire. The early Portuguese discoverers were not traders or private adventurers, but admirals with a royal commission to conquer territory and promote the spread of Christianity.

For exactly a century, from 1500 to 1600, the Portuguese enjoyed a monopoly of Oriental trade.

The Dutch were the first European nation to break through the Portuguese monopoly. During the sixteenth century Bruges, Antwerp, and Amsterdam became successively the great emporia whence Indian produce, imported by the Portuguese, was distributed to Germany, and even to England. At first the Dutch, following in the track of the English, attempted to find their way to India by sailing round the north coasts of Europe and Asia. William Barents is honorably known as the leader of three of these arctic expeditions, in the last of which he perished. The first Dutchman to double the Cape of Good Hope was Cornelius Houtman, who reached Sumatra and Bantam in 1596. Forthwith private companies for trade with the East were formed in many parts of the United Provinces, but in 1602 they were all amalgamated by the states-general into "The Dutch East India Company." Within a few years the Dutch had established factories on the continent of India, in Ceylon; in Sumatra, on the Persian Gulf, and on the Red Sea, besides having obtained exclusive possession of the Moluccas. In 1618 they laid the foundation of the city of Batavia in Java, to be the seat of the supreme government of the Dutch possessions in the East Indies, which had previously been at Amboyna. At about the same time they discovered the coast of Australia, and in North America founded the city of New Amsterdam, or Manhattan, now New York. During the seventeenth century the Dutch maritime power was the first in the world. The massacre of Amboyna in 1623 led the English East India Company to retire from the Eastern seas to the continent of India, and thus, though indirectly, contributed to the foundation of the British Indian empire. The long naval wars and bloody battles between the English and the Dutch within the narrow seas were not terminated until William of Orange united the two crowns in 1689. In the far East the Dutch ruled without a rival, and gradually expelled the Portuguese from almost all their territorial possessions. In 1635 they occupied Formosa; in 1640 they took Malacca, a blow from which the Portuguese never recovered; in 1651 they founded a colony at the Cape of Good Hope, as a half-way station to the East; in 1658 they captured Jaffnapatam, the last stronghold of the Portuguese in Ceylon; in 1664 they wrested from the Portuguese all their earlier settlements on the pepper-bearing coast of Malabar. The rapid and signal downfall of the Dutch colonial empire is to be explained by its short-sighted commercial policy. It was deliberately based upon a monopoly of the trade in spices, and remained from first to last destitute of the true imperial spirit.

The knell of Dutch supremacy was sounded by Clive, when in 1758 he attacked the Dutch at Chinsurah both by land and water, and forced them to an ignominious capitulation. In the great French war from 1781 to 1811 England wrested from Holland every one of her colonies, though Java was restored in 1816 and Sumatra in exchange for Malacca in 1824. At the present time the Dutch flag flies nowhere on the mainland of India.

The earliest English attempts to reach India were made by the Northwest Passage. In 1496 Henry VII. granted letters patent to John Cabot and his three sons (of whom one was the better known Sebastian) to fit out two ships for the exploration of that route. They failed, but discovered the island of Newfoundland, and sailed along the coast of America from Labrador to Virginia. In 1553 the ill-fated Sir Hugh Willoughby attempted to force a passage along the north of Europe and Asia, the successful accomplishment of which has been reserved for a Swedish savant of our own generation. Sir Hugh perished miserably, but his second in command, Chancellor, reached a harbor on the White Sea, now Archangel. Thence he penetrated by land to the court of the grand-duke of Moscow and laid the foundation of "the Russia Company for carrying on the overland trade between India, Persia, Bokhara, and Moscow." Many subsequent attempts were made at the Northwest Passage from 1576 to 1616, which have left on our modern maps the imperishable names of Frobisher, Davis, Hudson, and Baffin. Meanwhile, in 1577, Sir Francis Drake had circumnavigated the globe, and on his way home had touched at Ternate, one of the Moluccas, the king of which island agreed to supply the English nation with all the cloves it produced. The first Englishman who actually visited India was Thomas Stephens, in 1579, unless there be any foundation in fact for the statement of William of Malmesbury, that in the year 883 Sighelmus of Sherborne, being sent by King Alfred to Rome with presents to the pope, proceeded from thence to the East Indies to visit the tomb of St. Thomas at Mylapore (Mailapur, also called Saint Thomé, a suburb of Madras), and brought back with him a quantity of jewels and spices. Stephens was educated at New College, Oxford, and was rector of the Jesuits' College in Salsette. His letters to his father are said to have roused great enthusiasm in England to trade directly with India. In 1583 three English merchants, Ralph Fitch, James Newberry, and Leedes, went out to India overland as mercantile adventurers. The jealous Portuguese threw them into prison at Ormuz, and again at Goa. At length Newberry settled down as a shopkeeper at Goa, Leedes entered the service of the Great Mughal, and Fitch, after a lengthened peregrination in Ceylon, Bengal, Pegu, Siam, Malacca, and other parts of the East Indies, returned to England.

The defeat of the "Invincible Armada" in 1588, at which time the crowns of Spain and Portugal were united, gave a fresh stimulus to maritime enterprise in England; and the successful voyage of Cornelius Houtman in 1596 showed the way round the Cape of Good Hope into waters hitherto monopolized by the Portuguese.

The foundation of the English East India Company was on this wise:—"In 1599 the Dutch, who had now firmly established their trade in the East, having raised the price of pepper against us from 3s. per pound to 6s. and 8s., the merchants of London held a meeting on September 22d at Founders' Hall, with the lord mayor in the chair, and agreed to form an association for the purpose of trading directly with India. Queen Elizabeth also sent Sir John Mildenhall by Constantinople to the Great Mughal to apply for privileges for the English company, for which she was then preparing a charter, and on December 31, 1600, the English East India Company was incorporated by royal charter under the title of 'The Governor and Company of Merchants of London trading to the East Indies.'" The original company had only 125 shareholders, and a capital of £70,000, which was raised to £400,000, in 1612, when voyages were first undertaken on the joint-stock account. Courten's association, known also as "The Assada Merchants," from a factory founded by them in Madagascar, was established in 1635, but, after a period of internecine rivalry, united with the London Company in 1650. In 1655, the "Company of Merchant Adventurers" obtained a charter from Cromwell to trade with India, but united with the original company two years later. A more formidable rival subsequently appeared in the English company, or "General Society trading to the East Indies," which was incorporated under powerful patronage in 1698, with a capital of £2,000,000. According to Evelyn, in his *Diary* for March 5, 1698, "the old East India Company lost their business against the new company by ten votes in parliament, so many of their friends being absent, going to see a tiger baited by dogs." However, a compromise was speedily effected through the arbitration of Lord Godolphin in 1702, and the London and the English companies were finally amalgamated in 1709, under the style of "The United Company of Merchants of England trading to the East Indies." At the same time the Company advanced a loan to the State of £3,190,000 at 3 per cent. interest, in consideration of the exclusive privilege to trade to all places between the Cape of Good Hope and the Straits of Magellan.

The early voyages of the Company, from 1600 to 1612, are distinguished as the "separate voyages," twelve in number. The subscribers individually bore the expenses of each voyage, and reaped the whole profits. With the exception of the fourth, all these separate voyages were highly prosperous, the profits hardly ever falling below 100 per cent. After 1612 the voyages were conducted on the joint-stock account.

British Empire (1765 *to* 1890).

The political history of the British in India begins in the eighteenth century with the French wars in the Carnatic. Fort St. George, the nucleus of Madras, was their earliest territorial possession, properly so called, in India, having been founded by Thomas Day in 1639. The land on which it stood, with an area round of about five miles in length by one mile in breadth, was purchased from the rajah of Chandragiri, who claimed to be the lineal descendant of the Hindu emperors of Vijayanagar. The French settlement of Pondicherri, about 100 miles lower down the Coromandel coast, was established in 1672, and for many years the English and French traded side by side, without either active rivalry or territorial ambition. The English, especially, appear to have been submissive to the native powers at Madras no less than in Bengal. They paid their annual rent of 1,200 pagodas (say £500) to the deputies of the Mughal empire when Aurangzeb annexed the south, and on two several occasions bought off a besieging army with a heavy bribe.

On the death of Aurangzeb in 1707, the whole of southern India became practically independent of Delhi. In the Deccan Proper, the Nizam-ul-Mulk founded an independent dynasty, with Hyderabad for its capital, which exercised a nominal sovereignty over the entire south. The Carnatic, or the lowland tract between the central plateau and the eastern sea, was ruled by a deputy of the nizam, known as the nawab of Arcot, who in his turn asserted claims to hereditary sovereignty. Further south, Trichinopoli was the capital of a Hindu rajah, and Tanjore formed another Hindu kingdom under a degenerate descendant of the line of Sivaji. Inland, Mysore was gradually growing into a third Hindu state, while everywhere local chieftains, called *palegars* or *naiks*, were in semi-independent possession of citadels or hill-forts.

In that condition of affairs the flame of war was kindled between the English and the French in Europe in 1745. Dupleix was at that time governor of Pondicherri, and Clive was a young writer at Madras. An English fleet first appeared on the Coromandel coast, but Dupleix by a judicious present induced the nawab of Arcot to interpose and prevent hostilities. In 1746 a French squadron arrived, under the command of La Bourdonnais. Madras surrendered almost without a blow, and the only settlement left to the English was Fort St. David, a few miles south of Pondicherri, where Clive and a few other fugitives sought shelter. The nawab, faithful to his policy of impartiality, marched with 10,000 men to drive the French out of Madras, but he was signally defeated by a French force of only 400 men and two guns. In 1748 an English fleet arrived under Admiral Boscawen and attempted the siege of Pondicherri, while a land force co-operated under Major Lawrence, whose name afterward became associated with that of Clive. The French successfully repulsed all attacks, and at last peace was restored by the treaty of Aix-la-Chapelle, which gave back Madras to the English (1748).

The first war with the French was merely an incident in the greater contest in Europe. The second war had its origin in Indian politics, while England and France were at peace. The easy success of the French arms had inspired Dupleix with the ambition of founding a French empire in India, under the shadow of the existing Mahometan powers. Disputed successions at Hyderabad and at Arcot supplied him with the oppo tunity that he lacked. On both thrones he placed nominees of his own, and for a short time posed as the supreme arbiter of the entire south. In boldness of conception, and in knowledge of Oriental diplomacy, Dupleix has had probably no rival. But he was no soldier, and he was destined in that sphere to encounter the "heaven-born genius" of Clive. For the English of Madras, under the instinct of self-preservation, were compelled to maintain the cause of another candidate to the throne of Arcot in opposition to the nominee of Dupleix. This candidate was Muhammad Ali, afterward known in history as Wala-jah. The war that then ensued between the French and English, each with their native allies, has been exhaustively described in the pages of Orme. The one incident that stands out conspicuously is the capture and subsequent defense of Arcot by Clive in 1751. This heroic feat, even more than the battle of Plassey, established the reputation of the English for valor throughout India. Shortly afterward Clive returned to England in ill-health, but the war continued fitfully for many years. On the whole, English influence predominated in the Carnatic, and their candidate, Muhammad Ali, maintained his position at Arcot. But the French were no less supreme in the Deccan, whence they were able to take possession of the coast tract called "the Northern Circars." The final struggle was postponed until 1760, when Colonel (afterward Sir Eyre) Coote won the decisive victory of Wandewash over the French general Lally, and proceeded to invest Pondicherri, which was starved into capitulation in January, 1761. A few months later the hill-fortress of Gingee (Chenji) also surrendered. In the words of Orme, "that day terminated the long hostilities between the two rival European powers in Coromandel, and left not a single ensign of the French nation avowed by the authority of its government in any part of India."

Meanwhile the interest of history shifts with Clive to Bengal. The first English settlement in that part of India was Pippli in Orissa, to which the East India Company was permitted to trade in 1633, six years before the foundation of Madras. The river on which Pippli stood has since silted up, and the very site of the English settlement is now unknown and undiscoverable. In 1642 factories were opened at Balasore and Hugli (Hooghly), and in 1681 Bengal was erected into a presidency, as yet subject to Madras. The name of Calcutta is not heard of till 1686, when Job Charnock, the chief at Hooghly, was expelled by the deputy of Aurangzeb, and settled lower down the river on the opposite bank. There he acquired a grant of the three pretty villages of Sutanati, Gobindpur, and Kalighat (Calcutta), and founded the original Fort William in 1696.

At the time of Aurangzeb's death in 1707 the nawab or governor of Bengal was Murshid Kuli Khan, known also in European history as Jafar Khan. By birth a Brahman, and brought up as a slave in Persia, he united the administrative ability of a Hindu to the fanaticism of a renegade. Hitherto the capital of Bengal had been at Dacca on the eastern frontier of the empire, whence the piratical attacks of the Portuguese and of the Arakanese or Maghs could be most easily checked. Murshid Kuli Khan transferred his residence to Murshidabad (Moorshedabad), in the neighborhood of Kasimbazar (Cossimbazar), the river port of all the Ganges trade. The English, the French, and the Dutch had each factories at Kasimbazar, as well as at Dacca, Patna, and Maldah. But Calcutta was the headquarters of the English, Chandarnagar of the French, and Chinsurah of the Dutch, all three towns being situated close to each other in the lower reaches of the Hooghly, where the river is navigable for large ships. Murshid Kuli Khan ruled over Bengal prosperously for twenty-one years, and left his power to a son-in-law and a grandson. The hereditary succession was broken in 1740 by Ali Vardi Khan, who was the last of the great nawabs of Bengal. In his days the Marhatta horsemen began to ravage the country, and the English at Calcutta obtained permission to erect an earthwork, which is known to the present day as the Marhatta ditch. Ail Vardi Khan died in 1756, and was succeeded by his grandson, Siraj-ud-Daula (Surajah Dowlah), a youth of only eighteen years, whose ungovernable temper led to a rupture with the English within two months after his accession. In pursuit of one of his own family, who had escaped from his vengeance, he marched upon Calcutta with a large army. Many of the English fled down the river in their ships. The remainder surrendered after a feeble resistance, and were thrown as prisoners into the "black hole" or military jail of Fort William, a room about eighteen feet square, with only two small windows barred with iron. It was the month of June, in which the tropical heat of Calcutta is most oppressive. When the door of the prison was opened in the morning, only twenty-three persons out of one hundred and forty-six were found alive.

The news of this disaster fortunately found Clive returned to Madras, where also was a squadron of king's ships under Admiral Watson. Clive and Watson promptly sailed to the mouth of the Ganges with all the troops that could be got together. Calcutta was recovered with little fighting, and the nawab consented to a peace which restored to the company all their privileges and gave them compensation for their losses of property. It is possible that matters might have ended here if a fresh cause of hostilities had not suddenly arisen. War had just been declared between the English and French in Europe, and Clive, following the traditions of his early warfare in the Carnatic, attacked and captured Chandarnagar. Siraj-ud-Daula, exasperated by that breach of neutrality within his own dominions, took the side of the French. But Clive, again acting upon the policy he had learned from Dupleix, had provided himsef with a rival candidate to the throne. Undaunted, he marched out to the battlefield of Plassey (Palasi), at the head of about 1,000 Europeans and 2,100 sepoys, with nine pieces of artillery. The Mahometan army is said to have consisted of 50,000 foot, 18,000 horse, and 50 pieces of cannon. But there was a traitor in the Mahometan camp in the person of Mir Jafar, who had married a sister of the late nawab, Ali Vardi Khan. The battle was short but decisive. After a few rounds of artillery fire, Suraj-ud-Daula fled, and the road to Murshidabad was left open.

The battle of Plassey was fought on June 23, 1757, an anniversary afterward remembered when the mutiny was at its height in 1857. History has agreed to adopt this date as the beginning of the British empire in the East, but the immediate results of the victory were comparatively small, and several more hard-won fights were fought before even the Bengalis would admit the superiority of the British arms. For the moment, however, all opposition was at an end. Clive, again following in the steps of Dupleix, placed his nominee, Mir Jafar, upon the *masnad* at Murshidabad, being careful to obtain a patent of investiture from the Mughal court. Enormous sums were exacted from Mir Jafar as the price of his elevation. The company claimed 10,000,000 rupees as compensation for losses; for the English, the Indian, and the Armenian inhabitants of Calcutta there were demanded the sums of 5,000,000, 2,000,000, and 700,000 rupees; for the squadron 2,500,000 rupees, and an equal sum for the army. The members of the council received the following amounts: Mr. Drake, the governor, and Colonel Clive 280,000 rupees each; and Mr. Becker, Mr. Watts, and Major Kilpatrick 240,000 rupees each. The whole amounted to £2,697,750. The English, deluded by their avarice, still cherished extravagant ideas of Indian wealth; nor would they listen to the ungrateful truth. But it was found that there were no funds in the treasury to satisfy their inordinate demands, and they were obliged to be contented with one-half the stipulated sums, which, after many difficulties, were paid in specie and in jewels, with the exception of 584,905 rupees. The shares of the council were, however, paid in full. At the same time the nawab made a grant to the Company of the *zamindari* rights over an extensive tract of country around Calcutta, now known as the district of the Twenty-four Parganas. The area of this tract was about 882 square miles, and it paid a permanent revenue or quit-rent of about £23,000. The gross rental at first payable to the Company was £53,000, but within a period of ten years it had risen to £146,000. Originally the Company possessed only the *zamindari* rights, *i.e.*, revenue jurisdiction. The superior lordship, or right to receive the quit-rent, remained with the nawab; but in 1759 this also was parted with by the Delhi emperor, the nominal suzerain of the nawab, in favor of Clive, who thus became the landlord of his own masters, the Company. At that time, also, Clive was enrolled among the nobility of the Mughal empire, with the rank of commander of 6,000 foot and 5,000 horse. Clive's *jagir*, as it was called, subsequently became a matter of inquiry in England, and on his death it passed to the Company, thus merging the *zamindari* in the proprietary rights.

In 1758 Clive was appointed by the court of directors the first governor of all the Company's settlements in Bengal. From two quarters troubles threatened, which perhaps Clive alone was capable of overcoming. On the west the *shahzada* or imperial prince, known afterward as the emperor Shah Alam, with a mixed army of Afghans and Marhattas, and supported by the nawab wazir of Oudh, was advancing his own claims to the province of Bengal. In the south the influence of the French under Lally and Bussy was overshadowing the British at Madras. But the name of Clive exercised a decisive effect in both directions. Mir Jafar was anxious to buy off the shahzada, who had already invested Patna. But Clive in person marched to the rescue, with an army of only 450 Europeans and 2,500 sepoys, and the Mughal army dispersed without striking a blow. In the same year Clive despatched a force southward under Colonel Forde, which recaptured Masulipatam from the French, and permanently established British influence throughout the Northern Circars, and at the court of Hyderabad. He next attacked the Dutch, the sole European nation that might yet be a formidable rival to the English. He defeated them both by land and water; and from that time their settlement at Chinsurah existed only on sufferance.

From 1760 to 1765, while Clive was at home, the history of the English in Bengal contains little that is creditable. Clive had left behind him no system of government, but merely the tradition that unlimited sums of money might be extracted from the natives by the mere terror of the English name. In 1761 it was found expedient and profitable to dethrone Mir Jafar, the English nawab of Murshidabad, and substitute his son-in-law, Mir Kasim, in his place. On that occasion, besides private donations, the English received a grant of the three districts of Bardwan, Midnapur, and Chittagong, estimated to yield a net revenue of half a million sterling. But Mir Kasim proved to possess a will of his own, and to cherish dreams of independence. He retired from Murshidabad to Monghyr, a strong position on the Ganges, which commanded the only means of communication with the west. There he proceeded to organize an army, drilled and equipped after European models, and to carry on intrigues with the nawab wazir of Oudh. The actual outbreak of hostilities with the English happened on this wise: The Company's servants claimed the privilege of carrying on private trade throughout Bengal, free from inland dues and all other imposts. The assertion of this claim caused frequent affrays between the customs' officers of the nawab and those traders, who, whether falsely or not, represented that they were acting on behalf of the servants of the Company. The nawab alleged that his civil authority was everywhere being set at naught. The majority of the council at Calcutta would not listen to his statements. The governor, Mr. Vansittart, and Warren Hastings, then a junior member of council, attempted to effect some compromise. But the controversy had become too hot. The nawab's officers fired upon an English boat, and forthwith all Bengal was in a blaze. A force of 2,000 sepoys was cut to pieces at Patna, and about 200 Englishmen in various parts of the province fell into the hands of the Mahometans, and were subsequently massacred. But as soon as regular warfare commenced Mir Kasim met with no more successes. His trained regiments were defeated in two pitched battles by Major Adams, at Gheriah and at Udha-nala, and he himself took refuge with the nawab wazir of Oudh, who refused to deliver him up. This led to a prolongation of the war. Shah Alam, who had now succeeded his father as emperor, and Shuja-ud-Daula, the nawab wazir of Oudh, united their forces, and threatened Patna, which the English had recovered. A more formidable danger appeared in the English camp, in the form of the first sepoy mutiny. This was quelled by Major (afterward Sir Hector) Munro, who ordered twenty-four of the ringleaders to be blown from guns, an old Mughal punishment. In 1764 Major Munro won the decisive battle of Baxar, which laid Oudh at the feet of the conquerors, and brought the Mughal emperor as a suppliant to the English camp.

Meanwhile the council at Calcutta had twice found the opportunity they desired of selling the government of Bengal to a new nawab. But in 1765 Clive (now Baron Clive of Plassey, in the peerage of Ireland) arrived at Calcutta, as governor of Bengal for the second time, to settle the entire system of relations with the native powers. Two objects stand out conspicuously in his policy. First, he sought to acquire the substance, though not the name, of territorial power, by using the authority of the Mughal emperor for so much as he wished, and for no more; and, secondly, he desired to purify the Company's service by prohibiting illicit gains, and at the same time guaranteeing a reasonable remuneration from honest sources. In neither respect were the details of his plans carried out by his successors. But the beginning of our Indian administration dates from this second governship of Clive, just as the origin of our Indian empire dates from his victory at Plassey. Clive's first step was to hurry up from Calcutta to Allahabad, and there settle in person the fate of nearly half India. Oudh was given back to the nawab wazir, on condition of his paying £500,000 toward the expenses of the war. The provinces of Allahabad and Kora, forming the greater part of the Doab, were handed over to Shah Alam himself, who in his turn granted to the Company the *diwani* or financial administration of Bengal, Behar, and Orissa, and also the territorial jurisdiction of the Northern Circars. A puppet nawab was still maintained at Murshidabad, who received an annual allowance of about £500,000; and half that amount was paid to the emperor as tribute from Bengal. Thus was constituted the dual system of government, by which the English received all the revenues and undertook to maintain an army for the defense of the frontier, while the criminal jurisdiction vested in the nawab. In Indian phraseology, the Company was diwan and the nawab was nizam. As a matter of general administration, the actual collection of the revenues still remained for some years in the hands of native officials. In attempting to reorganize and purify the Company's service, Clive undertook a task yet more difficult than to partition the valley of the Ganges. The officers, civil and military alike, were all tainted with the common corruption. Their legal salaries were absolutely insignificant, but they had been permitted to augment them ten and a hundred fold by means of private trade and gifts from the native powers. Despite the united resistance of the civil servants, and an actual mutiny of 200 military officers, Clive carried through his reforms. Both private trade and the receipt of presents were absolutely prohibited for the future, while a substantial increase of pay was provided out of the monopoly of salt.

Lord Clive quitted India for the third and last time in 1767. Between that date and the arrival of Warren Hastings in 1772, nothing of importance occurred in Bengal beyond the terrible famine of 1770, which is officially reported to have swept away one-third of the inhabitants. The dual system of government, however, established by Clive, had proved a failure. Warren Hastings, a tried servant of the Company, distinguished alike for intelligence, for probity, and for knowledge of Oriental manners, was nominated governor by the court of directors, with express instructions to carry out a predetermined series of reforms. In their own words, the court had resolved to "stand forth as diwan, and to take upon themselves, by the agency of their own servants, the entire care and administration of the revenues." In the execution of this plan, Hastings removed the exchequer from Murshidabad to Calcutta, and for the first time appointed European officers, under the now familiar title of collectors, to superintend the revenue collections and preside in the civil courts. The urgency of foreign affairs, and subsequently internal strife at the council table, hindered Hastings from developing further the system of civil administration, a task finally accomplished by Lord Cornwallis.

Though Hastings always prided himself specially upon that reform, as well as upon the improvements he introduced into the collection of the revenues from salt and opium, his name will be remembered in history for the boldness and success of his foreign policy. From 1772 to 1774 he was governor of Bengal; from 1774 to 1785 he was the first titular governor-general of India, presiding over a council nominated, like himself, not by the Company, but by an Act of Parliament, known as the Regulating Act. In his domestic policy he was greatly hampered by the opposition of Francis; but, so far as regards external relations with Oudh, with the Marhattas, and with Hyder Ali, he was generally able to compel assent to his own measures. His treatment of Oudh may here be passed over as not being material to the general history of India, while the personal aspects of his rule have been fully discussed in a separate article. To explain his Marhatta policy, it will be necessary to give a short retrospective sketch of the history of that people.

Sivaji the Great, as already mentioned, died in 1680, while Aurangzeb was still on the throne. The family of Sivaji produced no great names, either among those who continued to be the nominal chiefs of the Marhatta confederacy, with their capital at Satara, or among the rajahs of Kolhapur and Tanjore. All real power passed into the hands of the peshwa, or Brahman minister, who founded in his turn an hereditary dynasty at Poona, dating from the beginning of the eighteenth century. Next rose several Marhatta generals, who, though recognizing the suzerainty of the peshwa, carved out for themselves independent kingdoms in different parts of India, sometimes far from the original home of the Marhatta race. Chief among these generals were the gaikwar in Guzerat, Sindhia, and Holkar in Malwa, and the Bhonsla rajah of Berar and Nagpur. At one time it seemed probable that the Marhatta confederacy would expel the Mahometans even from northern India; but the decisive battle of Panipat, won by the Afghans in 1761, gave a respite to the Delhi empire. The Marhatta chiefs never again united heartily for a common purpose, though they still continued to be the most formidable military power in India. In especial, they dominated over the British settlement of Bombay on the western coast, which was the last of the three presidencies to feel the lust of territorial ambition. For more than a hundred years, from its acquisition in 1661 to the outbreak of the first Marhatta war in 1775, the English on the west coast possessed no territory outside the island of Bombay and their fortified factory at Surat.

The Bombay Government was naturally emulous to follow the example of Madras and Bengal, and to establish its influence at the court of Poona by placing its own nominee upon the throne. The attempt took form in 1775 in the treaty of Surat, by which Raghunath Rao, one of the claimants to the throne of the peshwa, agreed to cede Salsette and Bassein to the English, in consideration of being himself restored to Poona. The military operations that followed are known as the first Marhatta war. Warren Hastings, who in his capacity of governor-general claimed a right of control over the decisions of the Bombay Government, strongly disapproved of the treaty of Surat, but, when war once broke out, he threw the whole force of the Bengal army into the scale. One of his favorite officers, General Goddard, marched across the peninsula from sea to sea, and conquered the rich province of Guzerat almost without a blow. Another, Captain Popham, stormed the rock-fortress of Gwalior, which was regarded as the key of Hindustan. Those brilliant successes atoned for the disgrace of the convention of Wargaum in 1779, when the Marhattas dictated terms to a British force, but the war was protracted until 1782. It was then closed by the treaty of Salbye, which practically restored the *status quo*. Raghunath Rao, the English claimant, was set aside; Guzerat was restored, and only Salsette and some other small islands were retained by the English.

Meanwhile Warren Hastings had to deal with a more formidable enemy than the Marhatta confederacy. The reckless conduct of the Madras Government had roused the hostility both of Hyder Ali of Mysore and of the nizam of the Deccan, the two strongest Musalman powers in India, who attempted to draw the Marhattas into an alliance against the English. The diplomacy of Hastings won over the nizam and the Marhatta rajah of Nagpur, but the army of Hyder Ali fell like a thunderbolt upon the British possessions in the Carnatic. A strong detachment under Colonel Baillie was cut to pieces at Pollilore, and the Mysore cavalry ravaged the country unchecked up to the walls of Madras. For the second time the Bengal army, stimulated by the energy of Hastings, saved the honor of the English name. Sir Eyre Coote, the victor of Wandewash, was sent by sea to relieve Madras with all the men and money available, while Colonel Pearse marched south overland to overawe the rajah of Berar and the nizam. The war was hotly contested, for Sir Eyre Coote was now an old man, and the Mysore army was well disciplined and equipped, and also skillfully handled by Hyder and his son Tipu (Tippoo). Hyder died in 1782, and peace was finally concluded with Tipu in 1784, on the basis of a mutual restitution of all conquests.

It was Warren Hastings' merit to organize the empire which Clive founded. He was governor or governor-general for thirteen years, a longer period than any of his successors. During that time the English lost the American colonies, but in India their reputation steadily rose to its highest pitch. Within a year Hastings was succeeded by Lord Cornwallis, the first English nobleman of rank who undertook the office of governor-general. His rule lasted from 1786 to 1793, and is celebrated for two events—the introduction of the Permanent Settlement into Bengal, and the second Mysore war. If the foundations of the system of civil administration were laid by Hastings, the superstructure was erected by Cornwallis. It was he who first intrusted criminal jurisdiction to Europeans, and established the Nizamat Sadr Adalat, or supreme court of criminal judicature, at Calcutta; and it was he who separated the functions of collector and judge. The system thus organized in Bengal was afterward transferred to Madras and Bombay, when those presidencies also acquired territorial sovereignty. But the achievement most familiarly associated with the name of Cornwallis is the permanent settlement of the land revenue of Bengal. Up to his time the revenue had been collected pretty much according to the old Mughal system. *Zamindars*, or government farmers, whose office always tended to become hereditary, were recognized as having a right of some sort to collect the revenue from the actual cultivators. But no principle of assessment existed, and the amount actually realized varied greatly from year to year. Hastings had the reputation of bearing hard upon the *zamindars*, and was absorbed in other critical affairs of state or of war. On the whole he seems to have looked to experience, as acquired from a succession of quinquennial settlements, to furnish the standard rate of the future. Francis, on the other hand, Hastings' great rival, deserves the credit of being among the first to advocate a limitation of the State demand in perpetuity. The same view recommended itself to the authorities at home, partly because it would place their finances on a more stable basis, partly because it seemed to identify the *zamindar* with the more familiar landlord. Accordingly, Cornwallis took out with him in 1787 instructions to introduce a permanent settlement. The process of assessment began in 1789 and terminated in 1791. No attempt was made to measure the fields or calculate the out-turn as had been done by Akbar, and is now done when occasion requires in the British provinces; but the amount payable was fixed by reference to what had been paid in the past. At first the settlement was called decennial, but in 1793 it was declared permanent forever. The total assessment amounted to *sikka* Rs. 26,800,989, or about £2,750,000 sterling. Though Lord Cornwallis carried the scheme into execution, all praise or blame, so far as details are concerned, must belong to Sir John Shore, afterward Lord Teignmouth, whose knowledge of the country was unsurpassed by that of any civilian of his time. Shore would have proceeded more cautiously than Cornwallis' preconceived idea of a proprietary body and the court of directors' haste after fixity permitted.

The second Mysore war of 1790–92 is noteworthy on two accounts: Lord Cornwallis, the governor-general, led the British army in person, with a pomp and lavishness of supplies that recalled the campaigns of Aurangzeb; and the two great native powers, the nizam of the Deccan and the Marhatta confederacy, co-operated as allies of the British. In the result, Tipu Sultan submitted when Lord Cornwallis had commenced to beleaguer his capital. He agreed to yield one-half of his dominions to be divided among the allies, and to pay £3,000,000 toward the cost of the war. Those conditions he fulfilled, but ever afterward he burned to be revenged upon his English conquerors.

The period of Sir John Shore's rule as governor-general, from 1793 to 1798, was uneventful. In 1798 Lord Mornington, better known as the marquis of Wellesley, arrived in India, already inspired with imperial projects that were destined to change the map of the country. Mornington was the friend and favorite of Pitt, from whom he is thought to have derived the comprehensiveness of his political vision and his antipathy to the French name. From the first he laid down as his guiding principle that the English must be the one paramount power in the peninsula, and that native princes could only retain the insignia of sovereignty by surrendering the substance of independence. The subsequent political history of India has been but the gradual development of this policy, which received its finishing touch when Queen Victoria was proclaimed empress of India in 1877.

To frustrate the possibility of a French invasion of India, led by Napoleon in person, was the governing idea of Wellesley's foreign policy; for France at this time, and for many years later, filled the place afterward occupied by Russia in the imagination of English statesmen. Nor was the possibility so remote as might now be thought. French regiments guarded and overawed the nizam of Hyderabad. The soldiers of Sindhia, the military head of the Marhatta confederacy, were disciplined and led by French adventurers. Tipu Sultan carried on a secret correspondence with the French directorate, and allowed a tree of liberty to be planted in his dominions. The islands of Mauritius and Bourbon afforded a convenient half-way house both for French intrigue and for the assembling of a hostile expedition. Above all, Napoleon Bonaparte was then in Egypt, dreaming of the conquests of Alexander; and no man knew in what direction he might turn his hitherto unconquered legions. Wellesley first addressed himself to the nizam, where his policy prevailed without serious opposition. The French battalions at Hyderabad were disbanded, and the nizam bound himself by treaty not to take any European into his service without the consent of the English Government—a clause since inserted in every engagement entered into with native powers. Next, the whole weight of Wellesley's resources was turned against Tipu, whom Cornwallis had scotched but not killed. His intrigues with the French were laid bare, and he was given an opportunity of adhering to the new subsidiary system. On his refusal war was declared, and Wellesley came down in state to Madras to organize the expedition in person, and watch over the course of events. One English army marched into Mysore from Madras, accompanied by a contingent from the nizam. Another advanced from the western coast. Tipu, after offering but a feeble resistance in the field, retired into Seringapatam, and, when his capital was stormed, died fighting bravely in the breach. Since the battle of Plassey no event so greatly impressed the native imagination as the capture of Seringapatam, which won for General Harris a peerage, and for Wellesley an Irish marquisate. In dealing with the territories of Tipu, Wellesley acted with unusual moderation. The central portion, forming the old state of Mysore, was restored to an infant representative of the Hindu rajahs, whom Hyder Ali had dethroned, while the rest was partitioned between the nizam, the Marhattas, and the English. At about the same time the province of the Carnatic, or all that large portion of southern India ruled by the nawab of Arcot, and also the principality of Tanjore, were placed under direct British administration, thus constituting the Madras presidency almost as it has existed to the present day.

The Marhattas had been the nominal allies of the English in both their wars with Tipu, but they had never given active assistance, nor were they secured to the English side as the nizam now was. The Marhatta powers at this time were five in number. The recognized head of the confederacy was the peshwa of Poona, who ruled the hill country of the Western Ghats, the cradle of the Marhatta race. The fertile province of Guzerat was annually harried by the horsemen of the gaikwar of Baroda. In Central India two military leaders, Sindhia of Gwalior and Holkar of India, alternately held the pre-eminency. Toward the east the Bhonsla rajah of Nagpur, sprung from the same stock as Savaji, reigned from Berar to the coast of Orissa. Wellesley tried assiduously to bring these several Marhatta powers within the net of his subsidiary system. At last, in 1802, the necessities of the peshwa, who had been defeated by Holkar, and driven as a fugitive into British territory, induced him to sign the treaty of Bassein, by which he pledged himself to hold communications with no other power, European or native, and ceded territory for the maintenance of a subsidiary force. This greatly extended the English territorial influence in the Bombay presidency, but led directly to the second Marhatta war, for neither Sindhia nor the rajah of Nagpur would tolerate this abandonment of Marhatta independence. The campaigns that followed are perhaps the most glorious in the history of the British arms in India. The general plan and the adequate provision of resources were due to the marquis of Wellesley, as also the indomitable spirit that could not anticipate defeat. The armies were led by Sir Arthur Wellesley (afterward duke of Wellington) and General (afterward Lord) Lake. Wellesley operated in the Deccan, where, in a few short months, he won the decisive victories of Assaye and Argaum, and captured Ahmadnagar. Lake's campaign in Hindustan was no less brilliant, though it has received less notice from historians. He won pitched battles at Aligarh and Laswari, and captured the cities of Delhi and Agra, thus scattering the French troops of Sindhia, and at the same time coming forward as the champion of the Mughal emperor in his hereditary capitals. Before the year 1803 was out, both Sindhia and the Bhonsla rajah were glad to sue for peace. Sindhia ceded all claims to the territory north of the Jumna, and left the blind old emperor Shah Alam once more under British protection. The Bhonsla forfeited Orissa to the English, who had already occupied it with a flying column, and Berar to the nizam, who gained a fresh addition by every act of complaisance to the British Government. The freebooter, Jaswant Rao Holkar, alone remained in the field, supporting his troops by ravages through Malwa and Rajputana. The concluding years of Wellesley's rule were occupied with a series of operations against Holkar, which brought no credit on the British name. The disastrous retreat of Colonel Monson through Central India recalled memories of the convention of Wargaum and of the destruction of Colonel Baillie's force by Hyder Ali. The repulse of Lake in person at the siege of Bhartpur (Bhurtpore) is memorable as an instance of a British army in India having to turn back with its object unaccomplished.

The ambitious policy and the continuous wars of Lord Wellesley exhausted the patience of the court of directors at home. In 1804 Lord Cornwallis was sent out as governor-general a second time, with instructions to bring about peace at any price, while Holkar was still unsubdued, and Sindhia was threatening a fresh war. But Cornwallis was now an old man and broken down in health. Traveling up to the northwest during the rainy season, he sank and died at Ghazipur, before he had been ten weeks in the country. His immediate successor was Sir George Barlow, a civil servant of the Company, who, as a *locum tenens*, had no alternative but to carry out faithfully the orders of his employers. He is charged with being, under these orders, the only governor-general who diminished the area of British territory, and with violating engagements by abandoning the Rajput chiefs to the tender mercies of Holkar and Sindhia. During his administration also occurred the mutiny of the Madras sepoys at Vellore, which, though promptly suppressed, sent a shock of insecurity throughout the empire.

Lord Minto, governor-general from 1807 to 1813, consolidated the conquests which Wellesley had acquired. His only military exploits were the occupation of the island of Mauritius, and the conquest of Java by an expedition which he accompanied in person. The condition of Central India continued to be disturbed, but Minto succeeded in preventing any violent outbreaks without himself having recourse to the sword. The Company had ordered him to follow a policy of non-intervention, and he managed to obey his orders without injuring the prestige of the British name. In his time the Indian Government first opened relations with a new set of foreign powers, by sending embassies to the Punjab, to Afghanistan, and to Persia. The ambassadors were all trained in the school of Wellesley, and formed perhaps the most illustrious trio of "politicals" that the Indian service has produced. Metcalfe was the envoy to the court of Ranjit Sinh at Lahore; Elphinstone met the shah of Afghanistan at Peshawar; and Malcolm was dispatched to Persia. If it cannot be said that any of these missions were fruitful in permanent results, at least they introduced the English to a new set of diplomatic relations, and widened the sphere of their influence.

The successor of Lord Minto was Lord Moira, better known as the marquis of Hastings, who governed India for the long period of nine years, from 1814 to 1823. This period was marked by two wars of the first magnitude, the campaigns against the Gurkhas (Goorkhas) of Nepal, and the third and last Marhatta war. The Gurkhas, the present ruling race in Nepal, are Hindu immigrants who claim a Rajput origin. The indigenous inhabitants, called Newars, belong to the Indo-Tibetan stock, and profess Buddhism. The sovereignty of the Gurkhas dates only from 1767, in which year they overran the valley of Khatmandu, and gradually extended their power over all the hills and valleys of Nepal. Organized upon a sort of military and feudal basis, they soon became a terror to all their neighbors, marching east into Sikkim, west into Kumaun, and south into the Gangetic plains. In the last quarter their victims were British subjects, and at last it became imperatively necessary to check their advance. Sir George Barlow and Lord Minto had remonstrated in vain, and nothing was left to Lord Moira but to take up arms. The campaign of 1814 was little short of disastrous. After overcoming the natural difficulties of a malarious climate and precipitous hills, the sepoys were on several occasions fairly worsted by the unexpected bravery of the little Gurkhas, whose heavy knives or *kukris* dealt terrible execution. But in 1815 General Ochterlony, who commanded the army operating by way of the Sutlej, stormed one by one the hill forts which still stud the Himalayan states, now under the Punjab government, and compelled the Nepal *darbar* to sue for peace. In the following year the same general advanced from Patna into the valley of Khatmandu, and finally dictated the terms which had before been rejected, within a few miles of the capital. By the treaty of Segauli, which defines the English relations with Nepal to the present day, the Gurkhas withdrew on the one hand from Sikkim, and on the other from those lower ranges of the western Himalayas which have supplied the health-giving stations of Naini Tal, Massuri, and Simla. Meanwhile the condition of Central India was every year becoming more unsatisfactory. Though the great Marhatta chiefs were learning to live rather as peaceful princes than as leaders of predatory bands, the example of lawlessness they had set was being followed, and bettered in the following, by a new set of freebooters, known as the Pindharis. As opposed to the Marhattas, who were at least a nationality bound by some traditions of a united government, the Pindharis were merely irregular soldiers, corresponding most nearly to the free companies of mediæval Europe. Of no common race and of no common religion, they welcomed to their ranks the outlaws and broken tribes of all India—Afghans, Marhattas, or Jats. Their headquarters were in Malwa, but their depredations were not confined to Central India. In bands sometimes numbering a few hundreds, sometimes many thousands, they rode out on their forays as far as Malabar and the Coromandel coast. The most powerful of the Pindhari captains, Amir Khan, had an organized army of many regiments, and several batteries of cannon. Two other leaders, known as Chitu and Karim, at one time paid a ransom to Sindhia of £100,000. To suppress the Pindhari hordes, who were supported by the sympathy, more or less open, of all the Marhatta chiefs, Lord Hastings (1817) collected the strongest British army that had been seen in India, numbering nearly 120,000 men, half to operate from the north, half from the south. Sindhia was overawed, and remained quiet. Amir Khan consented to disband his army, on condition of being guaranteed the possession of what is now the principality of Tank. The remaining bodies of Pindharis were attacked in their homes, surrounded, and cut to pieces. Karim threw himself upon the mercy of the conquerors. Chitu fled to the jungles, and was killed by a tiger. In the same year (1817) as that in which the Pindharis were crushed, and almost in the same month (November), the three great Marhatta powers at Poona, Nagpur, and Indore rose against the English. The peshwa, Baji Rao, had long been chafing under the terms imposed by the treaty of Bassein (1802), and the subsequent treaty of Poona (1817), which riveted yet closer the chains of dependence upon the paramount power. Elphinstone, then resident at his court, foresaw what was coming and withdrew to Kirkee, whither he had ordered up a European regiment. The next day the residency was burned down, and Kirkee was attacked by the whole army of the peshwa. The attack was bravely repulsed, and the peshwa immediately fled from his capital. Almost the same plot was enacted at Nagpur, where the honor of the British name was saved by the sepoys, who defended the hill of Sitabaldi against enormous odds. The army of Holkar was defeated in the following month at the pitched battle of Mehidpur. All open resistance was now at an end. Nothing remained but to follow up the fugitives, and determine the conditions of the general pacification. In both these duties Sir John Malcolm played a prominent part. The dominions of the peshwa were annexed to the Bombay presidency, and the nucleus of the present Central Provinces was formed out of the territory saved from the Pindharis. The peshwa himself surrendered, and was permitted to reside at Bithur, near Cawnpur, on a pension of £80,000 a year. His adopted son was the infamous Nana Sahib. To fill the peshwa's place to some extent at the head of the Marhatta confederacy, the lineal descendant of Sivaji was brought forth from obscurity, and placed upon the throne of Satara. An infant was recognized as the heir of Holkar, and a second infant was proclaimed rajah of Nagpur under British guardianship. At the same time the several states of Rajputana accepted the position of feudatories of the paramount power. The map of India, as thus drawn by Lord Hastings, remained substantially unchanged until the time of Lord Dalhousie. But the proudest boast of Lord Hastings and Sir John Malcolm was, not that they had advanced the *pomœrium*, but that they had conferred the blessings of peace and good government upon millions who had suffered unutterable things from Marhatta and Pindhari tyranny.

The marquis of Hastings was succeeded by Lord Amherst, after the interval of a few months, during which Mr. Adam, a civil servant, acted as governor-general. Lord Amherst's administration lasted for five years, from 1823 to 1828. It is known in history by two prominent events, the first Burmese war and the capture of Bhartpur. For some years past the northeast frontier had been disturbed by the restlessness of the Burmese. The country that fringes the western shore of the Bay of Bengal and runs up the valley of the Irawadi, with a people of Tibeto-Chinese origin, has a history of its own, parallel to, but not altogether independent of, that of India. Tradition asserts that its early civilization was introduced from the opposite coast of Coromandel, by a people who still preserve a trace of their origin in their name of Talaing (*cf.* Telinga and Telugu). However this may be, the Buddhist religion, professed by the Burmese at the present day, certainly came direct from India at a very early date. Many waves of invasion from Siam in the south and from the wild mountains in the north have passed over the land. These conquests were marked by that wanton and wholesale barbarity which seems to characterize the Tibeto-Chinese race, but the civilization of Buddhism survived every shock, and flourished around the ancient pagodas. European travelers in the fifteenth century visited Pegu and Tenasserim, which they describe as flourishing marts of maritime trade. During the period of Portuguese predominance in the East, Arakan became the resort of loose European adventurers. With their help the Arakanese extended their power inland, occupied Chittagong, and (under the name of the Maghs) became the terror of the entire delta of the Ganges. About 1750 a new dynasty arose, founded by Alaungphaya or Alompra, with its capital at Ava, which still rules over Independent Burmah. The successors of Alompra, after having subjugated all Burmah, and overrun Assam, which was then an independent kingdom, began a series of encroachments upon British territory in India. As all peaceful proposals were contumeliously rejected, Lord Amherst was compelled to declare war in 1824. Little military glory could be gained by beating the Burmese, who were formidable only from the pestilential character of their country One expedition with gunboats proceeded up the Brahmaputra into Assam; another marched by land through Chittagong into Arakan, for the Bengal sepoys refused to go by sea; a third, and the strongest, sailed from Madras direct to the mouth of the Irawadi. The war was protracted over two years. At last, after the loss of about 20,000 lives and an expenditure of £14,000,000, the king of Ava consented to sign the treaty of Yandabu, by which he abandoned all claim to Assam, and ceded the provinces of Arakan and Tenasserim, which were already in the military occupation of the British. He retained all the valley of the Irawadi, down to the sea at Rangoon. The capture of Bhartpur in Central India by Lord Combermere, in 1827, wiped out the repulse which Lake had received before that city in January, 1805. A disputed succession necessitated British intervention. Artillery could make little impression upon the massive walls of mud, but at last a breach was effected by mining, and the city was taken by storm, thus losing its general reputation throughout India for impregnability, which had threatened to become a political danger.

The next governor-general was Lord William Bentinck, who had been governor of Madras twenty years earlier at the time of the mutiny of Vellore. His seven years' rule (from 1828 to 1835) is not signalized by any of those victories or extensions of territory by which chroniclers delight to measure the growth of empire. But it forms an epoch in administrative reform, and in the slow process by which the hearts of a subject population are won over to venerate as well as dread their alien rulers. The modern history of the British in India, as benevolent administrators ruling the country with a single eye to the good of the natives, may be said to begin with Lord William Bentinck. According to the inscription upon his statue at Calcutta, from the pen of Macaulay, "He abolished cruel rites; he effaced humiliating distinctions; he gave liberty to the expression of public opinion; his constant study it was to elevate the intellectual and moral character of the nations committed to his charge." His first care on arrival in India was to restore equilibrium to the finances, which were tottering under the burden imposed upon them by the Burmese war. This he effected by reductions in permanent expenditure, amounting in the aggregate to £1,500,000, as well as by augmenting the revenue from land that had escaped assessment and from the opium of Malwa. He also widened the gates by which educated natives could enter the service of the Company. Some of these reforms were distasteful to the covenanted service and to the officers of the army, but Lord William was always stanchly supported by the court of directors and by the Whig ministry at home.

His two most memorable acts are the abolition of *sati* (suttee) and the suppression of the *Thags* (Thugs). At this distance of time it is difficult to realize the degree to which these two barbarous practices had corrupted the social system of the Hindus. European research has clearly proved that the text in the *Vedas* adduced to authorize the immolation of widows was a willful mistranslation. But the practice had been ingrained in Hindu opinion by the authority of centuries, and had acquired the sanctity of a religious rite. The emperor Akbar is said to have prohibited it by law, but the early English rulers did not dare so far to violate the traditions of religious toleration. In the year 1817 no less than 700 widows are said to have been burned alive in the Bengal presidency alone. To this day the most holy spots of Hindu pilgrimage are thickly dotted with little white pillars, each commemorating a *sati*. In the teeth of strenuous opposition, both from Europeans and natives, Lord William carried the regulation in council on December 4, 1829, by which all who abetted *sati* were declared guilty of "culpable homicide." The honor of suppressing *Thagi* must be shared between Lord William and Captain Sleeman. *Thagi* was an abnormal excrescence upon Hinduism, in so far as the bands of secret assassins were sworn together by an oath based on the rites of the bloody goddess Kali. Between 1826 and 1835 as many as 1,562 Thags were apprehended in different parts of British India, and by the evidence of approvers the moral plague spot was gradually stamped out.

Two other historical events are connected with the administration of Lord William Bentinck. In 1833 the charter of the East India Company was renewed for twenty years, but only upon the terms that it should abandon its trade and permit Europeans to settle freely in the country. At the same time a legal or fourth member was added to the governor-general's council, who might not be a servant of the Company, and a commission was appointed to revise and codify the law. Macaulay was the first legal member of council, and the first president of the law commission. In 1830 it was found necessary to take the state of Mysore under British administration, where it continued to the year 1881, being then restored to its native ruler, under British protection, and in 1834 the frantic misrule of the rajah of Coorg brought on a short and sharp war. The rajah was permitted to retire to Benares, and the brave and proud inhabitants of that mountainous little territory decided to place themselves under the rule of the Company; so that the only annexation effected by Lord William Bentinck was "in consideration of the unanimous wish of the people."

Sir Charles (afterward Lord) Metcalfe succeeded Lord William as senior member of council. His short term of office is memorable for the measure which his predecessor had initiated, but which he willingly carried into execution, for giving entire liberty to the press. Public opinion in India, as well as the express wish of the court of directors at home, pointed to Metcalfe as the most fit person to carry out the policy of Bentinck, not provisionally, but as governor-general for a full term. Party exigencies, however, led to the appointment of Lord Auckland. From that date commences a new era of war and conquest, which may be said to have lasted for twenty years. All looked peaceful until Lord Auckland, prompted by his evil genius, attempted to place Shah Shuja upon the throne of Cabul, an attempt which ended in the gross mismanagement and annihiliation of the garrison placed in that city. The disaster in Afghanistan was quickly followed by the conquest of Sind, the two wars in the Punjab, the second Burmese war, and last of all the Mutiny. Names like Gough and Napier and Colin Campbell take the places of Malcolm and Metcalfe and Elphinstone.

For the first time since the days of the sultans of Ghazni and Ghor, Afghanistan had obtained a national king in 1747 in the person of the Ahmad Shah Durani, who found his opportunity in the confusion that followed on the death of the Persian conqueror, Nadir Shah. Before his death in 1773 Ahmad Shah had conquered a wide empire, from Herat to Peshawar and from Kashmir to Sind. His intervention on the field of Panipat (1761) turned back the tide of Marhatta conquest, and replaced a Mughal emperor on the throne of Delhi. But Ahmad Shah never cared to settle down in India, and kept alternate state at his two national capitals of Cabul and Kandahar. The Durani kings were prolific in children, who fought to the death with one another for the succession. At last, in 1826, Dost Muhammad, head of the powerful Barakzai family, succeeded in establishing himself as ruler of Cabul, with the subordinate title of amir (ameer), while two fugitive brothers of the Durani line were living under British protection at Ludhiana, on the frontier of the Punjab.

The attention of the English Government had been directed to Afghan affairs ever since the time of Lord Wellesley, who feared that Zaman Shah, then holding his court at Lahore, might follow in the path of Nadir Shah, and overrun Hindustan. The growth of the powerful Sikh kingdom of Ranjit Sinh effectually dispelled any such alarms for the future. Subsequently, in 1809, while a French invasion of India was still a possibility to be guarded against, Elphinstone was sent by Lord Minto on a mission to Shah Shuja to form a defensive alliance. Before the year was out, Shah Shuja had been driven into exile, and a third brother, Mahmud Shah, was on the throne.. In 1837, when the curtain rises upon the drama of English interference in Afghanistan, the usurper Dost Muhammad Barakzai was firmly established at Cabul. His great ambition was to recover Peshawar from the Sikhs; and when Captain Alexander Burnes arrived on a mission from Lord Auckland, with the ostensible object of opening trade, the Dost was willing to promise everything, if only he could get Peshawar. But Lord Auckland had another and more important object in view. At this time the Russians were advancing rapidly in Central Asia, and a Persian army, not without Russian support, was besieging Herat, the traditional bulwark of Afghanistan on the east. A Russian envoy was at Cabul at the same time as Burnes. The latter was unable to satisfy the demands of Dost Muhammad in the matter of Peshawar, and returned to India unsuccessful. Lord Auckland forthwith resolved upon the hazardous plan of placing a more subservient ruler upon the throne of Cabul. Shah Shuja, one of the two exiles at Ludhiana, was selected for the purpose. At this time both the Punjab and Sind were independent kingdoms. Sind was the less powerful of the two, and therefore a British army, escorting Shah Shujah, made its way by that route to enter Afghanistan through the Bolan Pass. Kandahar surrendered, Ghazni was taken by storm, Dost Muhammad fled across the Hindu Kush, and Shah Shuja was triumphantly led into the Bala Hissar at Cabul in August, 1839. During the two years that followed, Afghanistan remained in the military occupation of the British. The catastrophe occurred in November, 1841, when Sir Alexander Burnes was assassinated in the city of Cabul. The troops in the cantonments were then under command of General Elphinstone (not to be confounded with the civilian Mountstuart Elphinstone), with Sir William Macnaghten as chief political adviser. Elphinstone was an old man, unequal to the responsibilities of the position. Macnaghten was treacherously murdered at an interview with the Afghan chief, Akbar Khan, eldest son of Dost Muhammad. After lingering in their cantonments for two months, the British army set off in the depth of winter to find its way back to India through the passes. When they started they numbered 4,000 fighting men, with 12,000 camp followers. A single survivor, Doctor Brydon, reached the friendly walls of Jalalabad, where Sale was gallantly holding out. The rest perished in the defiles of Khurd, Cabul, and Jagdalak, either from the knives and matchlocks of the Afghans, or from the effects of cold. A few prisoners, mostly women, children, and officers, were considerately treated by the orders of Akbar Khan.

Within a month after the news reached Calcutta, Lord Auckland had been superseded by Lord Ellenborough, whose first impulse was to be satisfied with drawing off in safety the garrisons from Kandahar and Jalalabad. But bolder counsels prevailed. Pollock, who was marching straight through the Punjab to relieve Sale, was ordered to penetrate to Cabul, while Nott was only too glad not to be forbidden to retire from Kandahar through Cabul. After a good deal of fighting, the two English forces met at their common destination in September, 1842. The great *bazar* at Cabul was blown up with gunpowder, to fix a stigma upon the city; the prisoners were recovered, and all marched back to India, leaving Dost Muhammad to take undisputed possession of his throne. The drama closed with a bombastic proclamation from Lord Ellenborough, who had caused the gates from the tomb of Mahmud of Ghazni to be carried back as a memorial of "Somnath revenged."

Lord Ellenborough, who loved military display, had his tastes gratified by two more wars. In 1843 the Mahometan rulers of Sind, known as the "meers" or amirs, whose only fault was that they would not surrender their independence, were crushed by Sir Charles Napier. The victory of Miani, in which 3,000 British troops defeated 20,000 Baluchis, is perhaps the most brilliant feat of arms in Indian history; but an honest excuse can scarcely be found for the annexation of the country. In the same year a disputed succession at Gwalior, fomented by feminine intrigue, resulted in an outbreak of the overgrown army which the Sindhia family had been allowed to maintain. Peace was restored by the battles of Maharajpur and Punneah, at the former of which Lord Ellenborough was present in person.

In 1844 Lord Ellenborough was recalled by the court of directors, who differed from him on many points of administration, and distrusted his erratic genius. He was succeeded by Sir Henry (afterward Lord) Hardinge, who had served through the Peninsular War and had lost a hand at Ligny. It was felt on all sides that a trial of strength between the British and the Sikhs was at hand.

The Sikhs were not a nationality like the Marhattas, but a religious sect bound together by the additional tie of military discipline. They trace their origin to one Nanak, an excellent and successful preacher, who was born in the neighborhood of Lahore in the latter half of the fifteenth century, before the arrival of either Mughals or Portuguese in India. Nanak was a religious reformer, like others that arose in the country about that time, who preached the abolition of caste, the unity of the Godhead, and the obligation of leading a pure life. From Nanak ten *gurus* or apostles are traced down to Govind Sinh in 1708, with whom the succession stopped. Suffering continual persecution from the ruling Mahometans, which culminated in the reign of Aurangzeb, the Sikh religion maintained itself with extraordinary tenacity. At last the downfall of the Mughal empire transformed it into a territorial power, which possessed the only organization remaining in the Punjab. Even before the rise of Ranjit Sinh, offshoots from the Sikh *misls* or confederacies, each led by its elected *sardar*, had carved out for themselves feudal principalities along the banks of the Sutlej, some of which have endured to the present day. Banjit Sinh, the founder of the Sikh kingdom, was born in 1780. In his twentieth year he obtained the appointment of governor of Lahore from the Afghan emperor, and from that time he set himself to the task of basing a personal despotism upon the religious fanaticism of the Sikhs. The *khalsa* or "the liberated" were organized into an army under European officers, which for steadiness and religious fervor has had no parallel since the "Ironsides" of Cromwell. From Lahore as his capital he extended his conquests south to Multan, west to Peshawar, and north to Kashmir. On the east side alone he was hemmed in by the Sutlej, up to which river the authority of the British Government was advanced in 1804. Till his death in 1839 Ranjit Sinh was ever loyal to the engagements which he had entered into with Metcalfe in 1809. But he left no son capable of wielding his scepter. Lahore was torn by dissensions between rival generals, ministers, and queens. The only strong power was the army of the *khalsa*, which since the disaster in Afghanistan burned to measure its strength with the British sepoys. The French generals, Avitable and Court, were foolishly ousted, and the supreme military command was vested in a series of *panchayats* or elective committees of five.

In 1845 the Sikh army, numbering 60,000 men with 150 guns, crossed the Sutlej and invaded British territory. Sir Hugh Gough, the commander-in-chief, together with the governor-general, hurried up to the frontier. Within three weeks four pitched battles were fought, at Moodkee, Ferozshah, Aliwal, and Sobraon. The British loss on each occasion was heavy; but by the last victory the Sikhs were fairly driven into and across the Sutlej, and Lahore surrendered to the British. By the terms of peace then dictated the infant son of Ranjit, Dhulip Sinh, was recognized as rajah; the Jalandhar Doab, or tract between the Sutlej and the Ravi, was annexed; the Sikh army was limited to a specified number; Major Henry Lawrence was appointed to be resident at Lahore; and a British force was detailed to garrison the Punjab for a period of eight years. Sir H. Hardinge received a peerage, and returned to England in 1848.

Lord Dalhousie succeeded, whose eight years' administration (from 1848 to 1856) was more pregnant of results than that of any governor-general since Clive. Though professedly a man of peace, he was compelled to fight two wars, in the Punjab and in Burmah. These both ended in large acquisitions of territory, while Nagpur, Oudh, and several minor states also came under British rule. But Dalhousie's own special interest lay in the advancement of the moral and material condition of the country. The system of administration carried out in the conquered Punjab by the two Lawrences and their assistants is probably the most successful piece of difficult work ever accomplished by Englishmen. British Burmah has prospered under their rule scarcely less than the Punjab. In both cases Lord Dalhousie deserves a large share of the credit. No branch of the administration escaped his reforming hand. He founded the public works department, to pay special attention to roads and canals. He opened the Ganges Canal, still the largest work of the kind in the country, and he turned the sod of the first Indian railway. He promoted steam communication with England *via* the Red Sea, and introduced cheap postage and the electric telegraph. It is Lord Dalhousie's misfortune that these benefits are too often forgotten in the vivid recollections of the Mutiny, which avenged his policy of annexation.

Lord Dalhousie had not been six months in India before the second Sikh war broke out. Two British officers were treacherously assassinated at Multan. Unfortunately Henry Lawrence was at home on sick leave. The British army was not ready to act in the hot weather, and, despite the single-handed exertions of Lieutenant (afterward Sir Herbert) Edwardes, this outbreak of fanaticism led to a general rising. The *khalsa* army again came together, and once more fought on even terms with the British. On the fatal field of Chilianwala, which patriotism prefers to call a drawn battle, the British lost 2,400 officers and men, besides four guns and the colors of three regiments. Before re-enforcements could come out from England, with Sir Charles Napier as commander-in-chief, Lord Gough had restored his own reputation by the crowning victory of Guzerat, which absolutely destroyed the Sikh army. Multan had previously fallen; and the Afghan horse under Dost Muhammad, who had forgotten their hereditary antipathy to the Sikhs in their greater hatred of the British name, were chased back with ignominy, to their native hills. The Punjab henceforth became a British province, supplying a virgin field for the administrative talents of Dalhousie and the two Lawrences. Rajah Dhulip Sinh received an allowance of £50,000 a year, on which he retired as a country gentleman to Norfolk in England. The first step in the pacification of the Punjab was a general disarmament, which resulted in the delivery of no less than 120,000 weapons of various kinds. Then followed a settlement of the land tax, village by village, at an assessment much below that to which it had been raised by Sikh exactions, and the introduction of a loose but equitable code of civil and criminal procedure. Roads and canals were laid out by Colonel Robert Napier (afterward Lord Napier of Magdala); and the security of British peace and the personal influence of British officers were felt to the furthest corners of the province. Thus it happened that, when the Mutiny broke out in 1857, the Punjab remained not only quiet but loyal, after only eight years' experience of English rule; while the Northwestern Provinces, which had been British territory for more than half a century, rose in rebellion. The second Burmese war of 1852 was caused by the ill-treatment of European merchants at Rangoon, and the insolence offered to the captain of a frigate who had been sent to remonstrate. The whole valley of the Irawadi, from Rangoon to Prome, was occupied in a few months, and, as the king of Ava refused to treat, it was annexed, under the name of Pegu, to the provinces of Arakan and Tenasserim, which had been acquired in 1826. Since annexation the inhabitants of Rangoon have increased tenfold in number, and that port now ranks third in British India, being surpassed only by Calcutta and Madras. Lord Dalhousie's dealings with he feudatory states of India can only be rightly appreciated as part of his general policy. That rulers only exist for the good of the ruled was his supreme axiom of government, of which he gave the most conspicuous example by the practice of his own daily life. That British administration was better for the people than native rule followed from this axiom as a necessary corollary. He was thus led to regard native chiefs from somewhat the same point of view as the Scotch regarded the hereditary jurisdictions after 1745, as mischievous anomalies, to be abolished by every means practicable. Good faith must be kept with rulers on the throne and with their legitimate heirs, but no false sentiment should preserve dynasties that had forfeited all consideration by years of accumulated misrule, or prolong those that had no natural successor. The "doctrine of lapse" was merely a special application of these principles, though complicated by the theory of adoption. It has never been doubted that, according to Hindu private law, an adopted son entirely fills the place of a natural son, whether to perform the religious obsequies of his father or to inherit his property. In all respects he continues the *persona* of the deceased. But it was argued that the succession to a throne stood upon a different footing. The paramount power could not recognize such a right, which might be used as a fraud to hand over the happiness of millions to a base-born imposter. Here came in the maxim of "the good of the governed." The material benefits to be conferred through British administration surely weighed heavier in the scale than a superstitious and frequently fraudulent fiction of inheritance. The first state to escheat to the British Government in accordance with these principles was Satara, which had been reconstituted by Lord Hastings on the downfall of the peshwa in 1818. The last direct representative of Sivaji died without a male heir in 1848, and his deathbed adoption was set aside. In the same year the Rajput state of Karauli was saved by the interposition of the court of directors, who drew a fine distinction between a dependent principality and a protected ally. In 1833 Jhansi suffered the same fate as Satara. But the most conspicuous application of the doctrine of lapse was the case of Nagpur. The last of the Bhonslas, a dynasty older than the British Government itself, died without a son, natural or adopted, in 1853. That year also saw British administration extended to the Berars, or the assigned districts which the nizam of Hyderabad was induced to cede as a territorial guarantee for the subsidies which he perpetually kept in arrear. Three more distinguished names likewise passed away in 1853, though without any attendant accretion to British territory. In the extreme south the titular nawab of the Carnatic and the titular rajah of Tanjore both died without heirs. Their rank and their pensions died with them, though compassionate allowances were continued to their families. In the north of India, Baji Rao, the ex-peshwa who had been dethroned in 1818, lived on till 1853 in the enjoyment of his annual pension of £80,000. His adopted son, Nana Sahib, inherited his accumulated savings, but could obtain no further recognition.

The annexation of the province of Oudh is to be defended on very different grounds. Ever since the nawab wazir, Shuja-ud-Daula, received back his forfeited territories from the hands of Lord Clive in 1765, the very existence of Oudh as an independent state had depended only upon the protection of British bayonets. Thus, preserved alike from foreign invasion and from domestic rebellion, the long line of subsequent nawabs had given way to that neglect of public affairs and those private vices which naturally flow from irresponsible power. Their only redeeming virtue was steady loyalty to the British Government. Oudh has been called "the Garden of India" by an author who endeavors to show that the evils of native rule were never so black as they have been painted. But at any rate that fair corner of the Gangetic basin, which now supports a denser population than any equal area on the surface of the globe, had been groaning for generations under anarchy, for which each successive governor-general admitted that he was partly responsible. Warning after warning had been given to the nawabs (who had assumed the title of shah or king since 1819) that they must put their house in order. What the benevolent Bentinck and the soldierly Hardinge had only threatened was reserved for Lord Dalhousie, who united honesty of purpose with decision of character. In this determination he had the full support of the court of directors at home. In 1856, the last year of his rule, he issued orders to General (afterward Sir James) Outram, then resident at the court of Lucknow, to assume the direct administration of Oudh, on the ground that "the British Government would be guilty in the sight of God and man, if it were any longer to aid in sustaining by its countenance an administration fraught with suffering to millions." The king, Wajid Ali, bowed to irresistible force, though he ever refused to recognize the justice of his deposition. After a mission to England, by way of protest and appeal, he settled down in the pleasant suburb of Garden Reach, near Calcutta, where he lived in the enjoyment of a pension of £120,000 a year. Oudh was thus annexed without a blow; but it may be doubted whether the one measure of Lord Dalhousie, upon which he looked back himself with the clearest conscience, was not the very one that most alarmed native public opinion.

The marquis of Dalhousie resigned office in March, 1856, being then only forty-four years of age; but he carried home with him the seeds of a lingering illness which resulted in his death in 1860. Excepting Cornwallis, he was the first, though by no means the last, of English statesmen who have fallen victims to their devotion to India's needs. He was succeeded by his friend, Lord Canning, who, at the farewell banquet in England given to him by the court of directors, uttered these prophetic words: "I wish for a peaceful term of office. But I cannot forget that in the sky of India, serene as it is, a small cloud may arise, no larger than a man's hand, but which, growing larger and larger, may at last threaten to burst and overwhelm us with ruin." In the following year the sepoys of the Bengal army mutinied, and all the valley of the Ganges from Patna to Delhi rose in open rebellion.

The various motives assigned for the Mutiny appear inadequate to the European mind. The truth seems to be that native opinion throughout India was in a ferment, predisposing men to believe the wildest stories, and to act precipitately upon their fears. The influence of panic in an Oriental population is greater than might be readily believed. In the first place, the policy of Lord Dalhousie, exactly in proportion as it had been dictated by the most honorable considerations, was utterly distasteful to the native mind. Repeated annexations, the spread of education, the appearance of the steam engine and the telegraph wire, all alike revealed a consistent determination to substitute an English for an Indian civilization. The Bengal sepoys, especially, thought that they could see into the future farther than the rest of their countrymen. Nearly all men of high caste, and many of them recruited from Oudh, they dreaded tendencies which they deemed to be denationalizing, and they knew at first hand what annexation meant. They believed it was by their prowess that the Punjab had been conquered, and all India was held quiet. The numerous dethroned princes, their heirs and their widows, were the first to learn and take advantage of the spirit of disaffection that was abroad. They had heard of the Crimean war, and were told that Russia was the perpetual enemy of England. They had money in abundance with which they could buy the assistance of skillful intriguers. They had everything to gain, and nothing to lose, by a revolution.

In this critical state of affairs, of which the government had no official knowledge, a rumor ran through the cantonments of the Bengal army that cartridges had been served out greased with the fat of animals unclean alike to Hindu and Mahometan. After this, nothing could quiet the minds of the sepoys. Fires occurred nightly in the native lines; officers were insulted by their men; all confidence was gone, and only the form of discipline remained. On the afternoon of Sunday, May 10, 1857, the sepoys at Meerut (Mirath) broke into open mutiny. Their first mad frenzy marked by its excess the change from their usually quiet manners and orderly habits. They broke into the jail, and then ran through the cantonments, cutting down every European they met. At last they streamed off to the neighboring city of Delhi, to stir up the native garrison and the criminal population of that great city, and to place themselves under the authority of the discrowned Mughal emperor. Meerut was the largest military station in India, with a strong European garrison of foot, horse, and guns, sufficient to overwhelm the mutineers before ever they reached Delhi. But just as the sepoys acted in irrational panic, so did British officers in but too many cases act with equally irrational indecision. The news of the outbreak was telegraphed to Delhi, and nothing more was done that night. The next morning the Mahometans of Delhi rose, and all that the Europeans there could do was to blow up the magazine. A rallying center and a traditional name was thus given to the revolt, which forthwith spread like wildfire through all the Northwestern Provinces and Oudh down into Lower Bengal. The same narrative must suffice for all, though each episode has its own peculiar story of sadness and devotion. The sepoys rose on their officers, without warning, and sometimes after protestations of fidelity. The Europeans, or persons of Christian faith, were massacred, sometimes also women and children. The jail was broken open, the treasure plundered, and then all marched off to some center of revolt, to join in what had now become a national war. Only in the Punjab were the sepoys anticipated by the stern measures of repression and disarmament adopted by Sir John Lawrence and his lieutenants, among whom Edwardes and Nicholson were conspicuous. The Sikh population never wavered. Crowds of willing recruits came down from the Afghan hills. And thus the Punjab, instead of being itself a source of danger, was able to furnish a portion of its own garrison for the siege of Delhi. In Lower Bengal most of the sepoys mutinied, and then dispersed in different directions. The native armies of Madras and Bombay remained true to their colors. In Central India the contingents of many of the great chiefs sooner or later joined the rebels, but the Mahometan state of Hyderabad was kept loyal by the authority of its able minister, Sir Salar Jang.

The main interest of the sepoy war gathers around the three cities of Cawnpur, Lucknow, and Delhi. The cantonments at Cawnpur contained the largest native garrison in India; and in the immediate neighborhood, at Bithur, was the palace of Dandhu Panth, the disinherited heir of the last peshwa, whose more familiar appellation of Nana Sahib will ever be handed down to the infamy of history. At first the Nana was profuse in his professions of loyalty, but as soon as the sepoys mutinied he put himself at their head, and was proclaimed peshwa of the Marhattas. The Europeans at Cawnpur, who numbered more women and children than fighting men, shut themselves up in improvised intrenchments, where they sustained a siege for nineteen days under the sun of a tropical June. At last, trusting to a safe conduct from the Nana as far as Allahabad, they surrendered their position, and to the number of 450 individuals embarked in boats on the Ganges. Forthwith a murderous fire was opened upon them from the river bank. Only a single boat escaped, and but four men, who swam across to the protection of a friendly rajah, ultimately survived to tell the tale. The rest of the men were massacred on the spot; the women and children, numbering 125, were reserved for the same fate a few days later, when the avenging army of Havelock was at hand. Sir Henry Lawrence, the chief commissioner of Oudh, had foreseen the coming storm with a prophetic eye. He had fortified and provisioned the residency at Lucknow in good time, and thither he retired with all the European inhabitants and a weak British regiment on July 2d. Two days later he was mortally wounded by a shell. But his example inspired the little garrison to hold out under unparalleled hardships and against enormous odds, until relieved by Havelock and Outram on September 25th. But the relieving force was itself invested by fresh swarms of rebels, and it was not till November that Sir Colin Campbell, afterward Lord Clyde, cut his way into Lucknow, and effected the final deliverance of the garrison. The siege of Delhi began on June 8th, just one month after the original outbreak at Meerut. Siege in the proper sense of the word it was not, for the British army, encamped on the historic ridge, never exceeded 8,000 men, while the rebels within the walls were more than 30,000 strong.

In the middle of August Nicholson arrived with a re-enforcement from the Punjab, but his own encouraging presence was more valuable than the re-enforcement he brought. On September 14th the assault was delivered, and after six days' desperate fighting in the streets Delhi was again won. Nicholson fell at the head of the storming party. Hodson, the intrepid leader of a corps of irregular horse, hunted down and brought in as prisoner the old Mughal emperor, Bahadur Shah, and then in cold blood shot down the emperor's sons with his own hand. After the fall of Delhi and the final relief of Lucknow, the war loses its dramatic interest, though fighting went on in various parts of the country for eighteen months longer. The population of Oudh and Rohilkhand, stimulated by the presence of the begum of Oudh, the nawab of Bareilly, and Nana Sahib himself, had joined the mutinous sepoys *en masse*. In this quarter of India alone, it was the revolt of a people rather than the mutiny of an army that had to be quelled. Sir Colin Campbell in person conducted the campaign in Oudh, which lasted through two cold seasons. Valuable assistance was lent by Sir Jang Bahadur of Nepal, at the head of a numerous army of Gurkhas. Town after town was occupied, fort after fort was stormed, until at length the last gun had been recaptured and the last fugitive had fled across the frontier by January, 1859. In the meanwhile Sir Hugh Rose (afterward Lord Strathnairn), with another army from Bombay, was conducting an equally brilliant campaign in Central India. His most formidable antagonists were the disinherited rani of Jhansi, and Tantia Topi, whose military talent had previously inspired Nana Sahib with all the capacity for resistance that he ever displayed. The rani died fighting bravely at the head of her troops in June, 1858; Tantia Topi, after doubling backward and forward through Central India, was at last betrayed and run down in April, 1859.

The Mutiny sealed the fate of the East India Company, after a life of more than two and a half centuries.

The Company received its original charter of incorporation from Elizabeth in 1600. Its political powers and the constitution of the Indian Government were derived from the Regulating Act of 1773, passed by the ministry of Lord North. By that statute the governor of Bengal was raised to the rank of governor-general; and, in conjunction with his council of four other members, he was intrusted with the duty of superintending and controlling the governments of Madras and Bombay so far as regarded questions of peace and war; a supreme court of judicature was instituted at Calcutta, to which the judges were appointed by the crown; and a power of making rules, ordinances, and regulations was conferred upon the governor-general and his council. Next came the India Bill of Pitt (1784), which founded the board of control, strengthened the supremacy of Bengal over the other presidencies, and first authorized the historic phrase "governor-general-in-council." The act which abolished the Company's monopoly of trade (1833) also introduced several reforms into the constitution of the Indian Government, and added to the council an additional member, who might not be chosen from among the Company's servants, and was entitled to be present only at meetings for making laws and regulations; it gave the authority of acts of Parliament to the laws and regulations so made, subject to the disallowance of the court of directors; it appointed a law commission; and it gave the governor-general-in-council a control over the other presidencies in all points relating to the civil or military administration. The charter of the Company was renewed for the last time in 1853, not for a definite period of years, but only for so long as Parliament should ordain. On this occasion the number of directors was reduced, and their patronage as regards appointments to the civil service was taken away, to make room for the principle of open competition.

The act for the better government of India (1858), which finally transferred the entire administration from the Company to the crown, was not passed without an eloquent protest from the directors, nor without acrimonious party discussion in Parliament. It enacts that India shall be governed by, and in the name of, the sovereign of England through one of the principal secretaries of state, assisted by a council of fifteen members. The governor-general received the new title of viceroy. The European troops of the Company, numbering about 24,000 officers and men, were amalgamated with the royal service, and the Indian navy was abolished. By the Indian Councils Act (1861) the governor-general's council and also the councils at Madras and Bombay were augmented by the addition of non-official members, either natives or Europeans, for legislative purposes only; and by another act passed in the same year high courts of judicature were constituted out of the existing supreme courts at the presidency towns.

It fell to the lot of Lord Canning both to suppress the Mutiny and to introduce the peaceful revolution that followed. As regards his execution of the former part of his duties, it is sufficient to say that he preserved his equanimity undisturbed in the darkest hours of peril, and that the strict impartiality of his conduct incurred alternate praise and blame from the fanatics on either side. The epithet then scornfully applied to him of "Clemency" Canning is now remembered only to his honor. On November 1, 1858, at a grand *darbar* held at Allahabad the royal proclamation was published which announced that the queen had assumed the government of India. This document, which has been called the Magna Charta of the Indian people, went on to explain the policy of political justice and religious toleration which it was her royal pleasure to pursue, and granted an amnesty to all except those who had directly taken part in the murder of British subjects. Peace was proclaimed throughout India on July 8, 1859; and in the following cold weather Lord Canning made a viceregal progress through the upper provinces, to receive the homage of loyal princes and chiefs, and to guarantee to them the right of adoption. The suppression of the Mutiny increased the debt of India by about £40,000,000 sterling, and the military changes that ensued augmented the annual expenditure by about £10,000,000. To grapple with this deficit, Mr. James Wilson was sent out from the treasury as financial member of council. He reorganized the customs system, imposed an income tax and license duty, and created a state paper currency. The penal code, originally drawn up by Macaulay in 1837, passed into law in 1860, together with a code of civil and criminal procedure.

Lord Canning left India in March, 1862, and died before he had been a month in England. His successor, Lord Elgin, only lived till November, 1863, when he, too, fell a victim to the excessive work of the governor-generalship, dying at the Himalayan station of Dharmsala, where he lies buried. He was succeeded by Sir John Lawrence, the savior of the Punjab. The chief incidents of his administration were the Bhutan war and the terrible Orissa famine. Lord Mayo, who succeeded him in 1869, carried on the permanent British policy of moral and material progress with a special degree of personal energy. The Ambala (Umballa) darbar, at which Shere Ali was recognized as amir of Afghanistan, though in one sense merely the completion of what Lord Lawrence had begun, owed much of its success to the personal influence of Lord Mayo himself. The same quality, combined with sympathy and firmness, stood him in good stead in all his dealings both with native chiefs and European officials. His example of hard work stimulated all to their best. While engaged in exploring with his own eyes the farthest corners of the empire, he fell by the hand of an assassin in the convict settlement of the Andaman Islands in 1872. His successor was Lord Northbrook, whose ability showed itself chiefly in the department of finance. During the time of his administration a famine in Lower Bengal in 1874 was successfully obviated by government relief and public works, though at an enormous cost; the gaikwar of Baroda was dethroned in 1875 for misgovernment and disloyalty, while his dominions were continued to a nominated child of the family; and the Prince of Wales made a tour through the country in the cold weather of 1875-76. Lord Lytton followed Lord Northbrook in 1876.

On January 1, 1877, Queen Victoria was proclaimed Empress of India at a *darbar* of unequaled magnificence, held on the historic "ridge" overlooking the Mughal capital of Delhi. But, while the princes and high officials of the country were flocking to this gorgeous scene, the shadow of famine was already darkening over the south of India. Both the monsoons of 1876 had failed to bring their due supply of rain, and the season of 1877 was little better. The consequences of this prolonged drought, which extended from the Deccan to Cape Comorin, and subsequently invaded northern India, were more disastrous than any similar calamity since the introduction of British rule. Despite unparalleled importations of grain by sea and rail, despite the most strenuous exertions of the government, which incurred a total expenditure on this account of £11,000,000, the loss of life from actual starvation and its attendant train of diseases was lamentable. The total number of deaths from disease and want in the distressed tracts in excess of the normal mortality for the two years 1876-78 is estimated to have raised the death-rate by 40 per cent., or 5,250,000. In the autumn of 1878 the affairs of Afghanistan again forced themselves into notice. Shere Ali, the amir, who had been hospitably entertained by Lord Mayo, was found to be favoring Russian intrigues. A British embassy was refused admittance to the country, while a Russian mission was received with honor. This led to a declaration of war. British armies advanced by three routes—the Khaibar (Khyber), the Kuram, and the Bolan—and without much opposition occupied the inner entrances of the passes. Shere Ali fled to Afghan Turkestan, and there died. A treaty was entered into with his son, Yakub Khan, at Gandamak, by which the British frontier was advanced to the crests or further sides of the passes, and a British officer was admitted to reside at Cabul. Within a few months the British resident, Sir Louis Cavagnari, was treacherously attacked and massacred, together with his escort, and a second war became necessary. Yakub Khan abdicated, and was deported to India; Cabul was occupied in force, and an Afghan chief of the Durani line was placed in the government of Kandahar with the title of wali. At that crisis of affairs a general election in England resulted in a defeat of the ministry. Lord Lytton resigned with the Conservative ministry, and the marquis of Ripon was nominated as his successor in 1880. Since then, a British brigade received a defeat between Kandahar and the Helmand river from the Herati army of Ayub Khan, a defeat promptly and completely retrieved by the brilliant march of General Sir Frederick Roberts from Cabul to Kandahar, and by the total rout of Ayub Khan's army on September 1, 1880. Abdurrahman Khan, the eldest male representative of the stock of Dost Muhammad, was in 1880 proclaimed amir of Cabul. The reigning amir (1901) is Habibullah Khan.

THE GOVERNMENT OF INDIA.

The viceroy and governor-general, who is appointed by the crown, and whose ordinary term of office is five years, is supreme, but he is assisted by an executive council of six members, including the commander-in-chief. Power is reserved to him of overruling his council; but all acts of the government run in the name of the "governor-general in council." This body, forming the supreme government in India, passes in review the entire administration in six separate departments — finance and commerce, foreign, military, public works, home and the department of revenue and agriculture. Each department is under the charge of a secretary, and is also the special care of a member of the supreme council who has authority to deal with affairs of routine and minor importance, and to select what is worthy of the consideration of the governor-general and his collective council. The governor-general specially superintends the political business of the foreign office. The department of finance and commerce looks to questions of finance, to stamps, excise, the postoffice, and anything involving a permanent charge on the state; also to questions bearing on the commerce of the country. The most important subjects coming under the attention of the department of revenue and agriculture are the land revenue, forests, and the agricultural development of the country. The home department deals with the educational, medical, sanitary, ecclesiastical, judicial, municipalities, local government boards, police, and other matters, and has charge of the penal settlements of Port Blair and Nicobar. The foreign department conducts our relations with Afghanistan, Nepaul and other conterminous countries, and corresponds with the political agents of the numerous semi-independent native states of Rajputana and Central India, with the residents of Mysore, Cashmere, Baroda and Hyderabad. The marine service, as well as the army, is under the military department. The legal member takes charge of government bills in the legislative council, which consists of twelve members (besides the seven members of the executive council), of whom one-half must be unconnected with the public service. As only Bengal, Madras, Bombay and the Northwest Provinces possess councils of their own, the legislative council of India legislates for those provinces which are unprovided with local councils, or on matters of exceptional importance affecting the empire.

Separate high courts have been established for the presidencies of Madras and Bombay and for the lieutenant-governorship of Bengal (with jurisdiction also over Assam) and of the Northwest Provinces. The Punjaub has a chief court; the Central Provinces, Oudh and Mysore, have each a judicial commissioner, and Burmah has a judical commissioner and a recorder.

The Government of India is debited with the cost of the army for all India, with the interest on debt, and, generally, with all imperial as distinguished from provincial expenditure.

PROVINCES OF BRITISH INDIA.

The term "presidency," which is applied to the provinces or governments of Bengal, Madras and Bombay, is no longer correct, and in the case of Bengal is misleading. The expression is a relic of the time when the three settlements of Fort William, Fort St. George, and Bombay were each under the authority of a president, and comprised nearly the whole of the British possessions in India. Its use now frequently leads to the mistaken notion that British India is still divided into three presidencies; whereas it comprises nine separate provinces, each under its own civil government, but subordinate to the supreme government.

NATIVE STATES OF INDIA.

The native states of India cover an area of 610,000 square miles. They contain a population of about 61,000,000, and their united military forces are estimated at more than 300,000 men, mostly ill-armed and ill-disciplined. The gross revenues of the chiefs come to about Rx. 18,000,000, out of which an annual tribute of nearly Rx. 700,000 is paid to the British Government. The states vary greatly in size and importance. Hyderabad, for instance, is as large as the kingdom of Italy, and the Nizam enjoys a gross revenue of Rx. 3,330,000. On the other hand, in Kattywar and elsewhere, where family custom has led to minute subdivision, there are many chiefs of a single village. Between these two extremes there are states of every grade. Although, therefore, the number of Native States, large and small, amounts to as many as 800, only about 200 are of any importance. They may be classed under fourteen heads: 1. The Indo-Chinese group of States, and the numerous Hill tribes of the northeast frontier. 2. The aboriginal Gond and Kole tribes in Chota Nagpur, Orissa, the Central Provinces, and the Jaipur (Vizagapatam) Agency. 3. The Himalayan Hill States west of Nepaul (including Cashmere). 4. The numerous Afghan and Belooch tribes of the northwest frontier, inhabiting the mountains from the north of Peshawar to the base of the Suleiman range, a distance of 800 miles. 5. The Sikh States, in the Sirhind plain, south of the Sutlej. 6. The three Northern Mohammedan States of Khairpur in Sind, Bahawalpur to the northeast of it, and Rampur, from which Warren Hastings expelled the Rohillas in 1774. 7. The ancient sovereignties of Rajputana, lying to the south of the Punjab, and between Sind and the Northwest Provinces. 8. The States of Central India, lying to the north of the Nerbudda, and to the south and east of Rajputana. 9. Guzerat, including Kutch, and the numerous petty chiefships, of Kattywar. 10. The southern Marhatta States. 11. Baroda. 12. Hyderabad. 13. Mysore. 14. The Malayalim States of Travancore and Cochin, lying together in the far south.

The Nizam of Hyderabad, on the attainment of his majority, was installed in the presence of the viceroy, on February 5, 1884. Cashmere was granted to Gholab Sing by Lord Hardinge, after the first Punjaub war. His son and successor, Runbir Sing, died on September 12, 1885, and was succeeded by the present Maharaja, Pertab Sing, when also a British Resident was appointed and stronger pressure was brought to bear in favor of much needed reforms in the government. In 1889, in consequence of continued misgovernment, the Maharaja was deprived of his powers, which were intrusted to a native council, assisted by the advice of the Resident. Cashmere commands important trade routes to Central Asia, and is renowned for the beauty of its scenery and the excellence of its climate. Of the Sikh States the most important is Patiala. Rajputana measures some 460 miles from north to south, and 530 miles in breadth; it has a population of about ten and one-quarter millions. Of the nineteen principalities, the most important are Jodhpur (Marwar), Oudipur (Meywar) and Jaipur. The Rajput dynasties are very ancient. They offered the most obstinate resistance to the Mohammedan invaders, but were finally conquered by Sultan Baber, at the battle of Sikri, near Agra, in 1527. The governor-general's agent, whose headquarters are at Ajmir, had under him a staff of twenty officers, who are distributed among the States to overlook the administration, and give advice when it is needed or asked for. The military forces of these States are set down at 70,000 men. The Central India States, which are one-third less in extent than Rajputana, are split up into nearly four times as many states. The two most important are Gwalior and Indore, which include between them one-half of the whole area. Scindia has an admirably equipped army of more than 20,000 men. The historic fortress of Gwalior, which had been held by the British since the mutiny, was given back to Scindia in 1886. The opium grown in Malwa is a valuable source of revenue to the Maharaja of Indore and to the Indian Government. Bhopal, one of the principal Mohammedan States of India, has for three generations prospered under female rule. In 1875 the reigning Gaekwar of Baroda was deposed, but the native administration was continued under an adopted heir. In 1881 the province of Mysore, which had been administered by the British Government since 1834, was restored to the Maharaja Chamrajendra Wadiar Bahadur on his attaining his majority. The revenue slightly exceeds Rx. 1,000,000, and the tribute to the British Government is Rx. 250,000.

A number of the most important native chiefs gave proof of their loyalty in 1888 by offering their troops and large sums of money to the Indian Government to aid the defense of the northwest frontier. Actual sums of money were offered, by the Nizam of Hyderabad 60 lacs, Jeypore 15 lacs, Kashmir and Jodhpur 10 lacs each, and by several other States, and these and other States placed their troops and resources at the service of the Indian Government. The offers of money have been declined, but progress has been made in organizing a system by which these States will be able to render efficient aid to the supreme government in times of emergency.

RAILWAYS, ETC.

The number of miles open for traffic on March 31, 1900, was 24,707; in addition there were many miles of line then under construction, or already sanctioned for construction.

The army in India (April 1, 1888) had an actual strength of 288,567 officers and men (British troops 69,910, native 218,657). Six garrison batteries of royal artillery were added to the Indian establishment in 1887–88. This completed the increase to the army in India sanctioned in 1885. Only nine out of ninety-seven batteries of artillery are native. There are nine British cavalry regiments and fifty-three British infantry battalions. The native troops contain forty-eight regiments and corps of cavalry, and 127 battalions and corps of infantry. For police duties and frontier service the regular military is supplemented by about 163,000 native police, officered mainly by Europeans. There were in addition, in 1887–88, 18,388 enrolled European volunteers, of whom 15,458 were declared efficient. A reserve force of native soldiers is also being organized.

Some military operations had still to be carried on in Upper Burmah among the wild border tribes. It was, however, found possible to reduce the military garrison of that province from 26,000 to 12,000 men. The operations against the Tibetans, who had occupied Lingtu and the Jalapla Pass in Sikkim, were successfully terminated. Slighter troubles also occurred on the Chittagong frontier, where the raiding tribes had to be punished.

Education has made steady progress of late years. The number of educational institutions in 1887–88 was 133,352, and the number of students was 3,473,895, as compared with 63,775 schools and 1,812,382 students in 1878–79. Of the institutions, 18,278 were maintained by the State, and 60,026 aided by grants. The remainder were private and unaided. The policy of the government aims principally at improving and extending elementary education. There are five universities in India, founded on the model of the University of London, viz., those of Calcutta, Madras and Bombay, the Punjab University, and a fifth that was opened in 1887 at Allahabad.

The Indian municipalities began for the most part in 1884–85 to enjoy the more popular system of representation granted to them by Lord Ripon's measures of local self-government. The result appears to have been moderately successful. Some municipalities which were prematurely started have been closed, and the number existing in India in 1887–88 was 726, as compared with 749 in 1885–86. Their total expenditure amounted in 1887–88 to nearly 30,000,000 rupees. In several provinces local self-government by means of representative district boards has been largely introduced for rural districts.

NATIVE PRINCES.

The most important of the native princes are:—

PRINCES.	Sq. M.	Pop. 1881.	Revenue.
			Rx.*
Nizam of Hyderabad	81,807	9,845,594	3,330,000
Gaekwar of Baroda	8,570	2,185,005	1,523,000
Maharaja of Gwalior	29,067	3,115,857	1,120,000
" Mysore	24,723	4,186,188	1,020,000
" Cashmere	80,000	† 1,534,972	700,000
" Travancore	6,730	2,311,379	667,000
" Jaipur	14,465	2,534,357	603,000
" Indore	8,402	1,055,217	574,000
" Patiala	5,887	1,467,433	479,000
" Jodhpur	37,000	1,750,403	407,000
Begum of Bhopal	6,874	954,901	351,000
Thakor Saheb of Bhawnagar	2.860	400,323	348,000
Rajah of Kolhapur	2,816	800,189	312,505
Maharaja of Bhurtpur	1,974	645,450	264,000
" Ulwar	3,024	682,926	261,000
" Oudipur	12,670	1,494,220	260,000

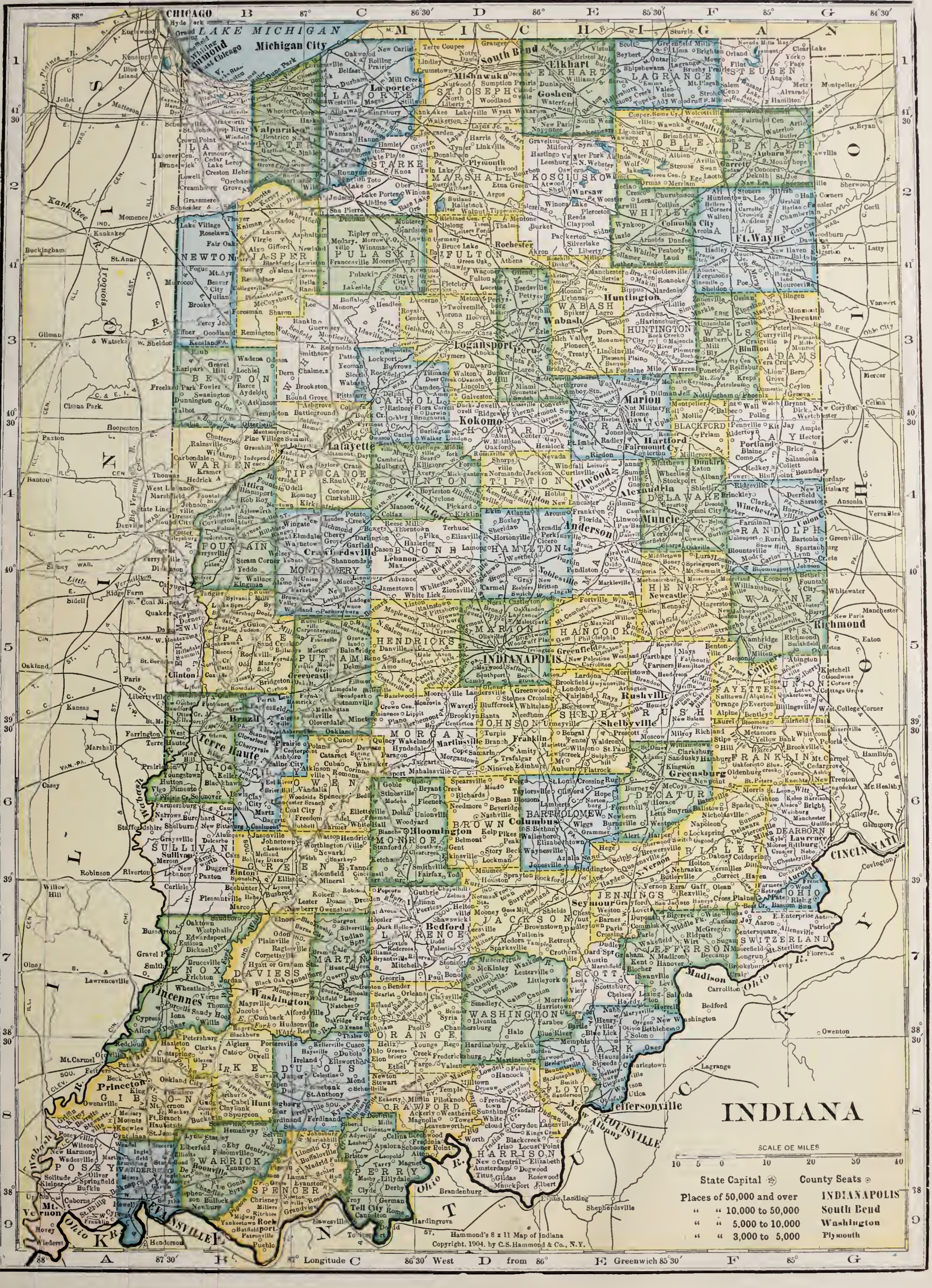
*Rx. 10 Rupees, nominally equivalent to £1. †In 1873.

GOVERNORS-GENERAL OF INDIA UNDER THE EAST INDIA COMPANY, 1765–1858.

1765. Lord Clive.
1767. Harry Verelst.
1769. John Cartier.
1772. Warren Hastings.
1786. Lord (afterward Marquis) Cornwallis.
1793. Sir John Shore (Lord Teignmouth).
1798. Sir Alured Clarke, (*pro tem.*)
1798. Lord Mornington (Marquis Wellesley).
1805. Lord Cornwallis again.
1805. Sir George Barlow, (*pro tem.*)
1806. Earl of Minto.
1813. Earl of Moira (Marquis of Hastings).
1823. John Adam, (*pro tem.*)
1823. Lord Amherst.
1828. Lord William Cavendish Bentinck.
1835. Sir Charles Metcalfe (Lord Metcalfe).
1836. Lord Auckland.
1842. Earl of Ellenborough.
1844. Viscount Hardinge.
1848. Earl (afterward Marquis) of Dalhousie.
1856. Earl Canning.

VICEROYS OF INDIA UNDER THE CROWN, 1862–1902.

1862. Earl of Elgin.
1864. Lord Lawrence.
1869. Earl of Mayo.
1872. Lord Northbrook.
1876. Lord Lytton.
1880. Marquis of Ripon.
1885. Earl Dufferin.
1888. Marquis of Lansdowne.
1894. Earl of Elgin.
1898. Lord Curzon.


INDIANA
SCALE OF MILES
10 5 0 10 20 30 40
State Capital ⊛ County Seats ⊙
Places of 50,000 and over INDIANAPOLIS
" " 10,000 to 50,000 South Bend
" " 5,000 to 10,000 Washington
" " 3,000 to 5,000 Plymouth
Longitude West from Greenwich
LAKE MICHIGAN
MICHIGAN
OHIO
KENTUCKY
ILLINOIS

Hammond's 8 x 11 Map of Indiana

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***INDIANA**, the name obviously meaning "Land of Indians," is one of the great "prairie States" of the eastern Mississippi Valley. It was the sixth new State admitted to the Union after the original thirteen, and is now the eighth in population.

Description.— Indiana lies between the parallels of 37° 47′ and 41° 50′ north Latitude, and the meridians of 84° 49′ and 88° 2′ Longitude west from Greenwich. Its area comprises 35,910 square miles of land and 440 of water. It is bounded on the north by Lake Michigan and the State of Michigan, on the east by Ohio, on the south by Kentucky, from which it is separated by the Ohio River, and on the west by Illinois, from which it is separated for part of the way by the Wabash River. The surface of the land is generally level or undulating, with a slight slope toward the south and west. The highest elevation is 1,250 and the lowest 300 feet above tidewater. A few sand hills are found in the north near Lake Michigan, and in the south there are numerous rocky elevations called "knobs." There are also numerous lakes and marshes in the northwestern part of the State. The whole State has an abundance of water, in addition to Lake Michigan and the Ohio River, which bound it at the north and south, the Wabash River, with its tributaries, flows across it from northeast to southwest, and the Kankakee, Tippecanoe, White, St. Joseph and innumerable smaller rivers traverse it in all directions. The climate of Indiana varies somewhat according to latitude. In the central part of the State the average winter temperature is from 29° to 41°, and in summer from 71° to 80°, Fahrenheit. The annual rainfall is about 43 inches.

Resources and Products.— The geological structure of Indiana is Permo-Carboniferous, Devonian and Silurian. Consequently the State is rich in minerals, such as coal, sandstone, limestone, clays, glass, sand and petroleum. Enormous veins of natural gas have been tapped, giving material for light, heat and power. The soil is generally very rich, and agriculture is practiced with great success. The principal crops are corn, wheat, rye, oats, buckwheat, barley, tobacco, potatoes, and hay. In the year 1900 the 221,897 farms of the State had a total of 21,619,623 acres. The land and buildings were worth $841,735,340; the implements and machinery, $27,330,370; and the live stock, $109,550,761; making a total farm value of $978,616,471. Among leading farm products in 1902 were 35,484,448 bushels of wheat, 2,635,215 tons of hay, and 6,240,000 pounds of wool.

Industries.— The railroad mileage of the State in 1902 was 6,756. Manufacturing establishments in 1900 numbered 18,015, with a capital of $234,481,528. The 155,956 employes received $66,847,317 in wages. The value of material used was $214,961,610, and the value of the finished product was $378,120,140. Much of the State is or was heavily wooded, and the lumber industries have attained great proportions. Among manufactures may be mentioned furniture, wagons and carriages, agricultural and milling machinery, glass, pottery, and musical instruments.

There has in recent years been an enormous increase in the internal revenue collected in Indiana. In 1894 it was less than $5,000,000, but in 1903 it was $28,183,610. This is due largely to the increase in distillation of spirits, Indiana now ranking as the third State in the Union in that respect, with an output in 1902 of 21,499,615 gallons. The State is also fourth in the production of oleomargarine, making in 1902 11,192,496 pounds.

Finance.— The loans and discounts of six national banks in Indianapolis in 1902 were $16,550,885, and of 139 country banks throughout the State, $45,901,970. The savings banks had 24,362 depositors, and $7,288,506 deposits. The Indianapolis clearing house exchanges aggregated $254,060,490.

Education.— The school population of Indiana, between the ages of 5 and 18, in 1900, was estimated at 696,401, with a school enrollment of 564,807, and an average attendance of 429,566. The average school year was 152 days long. There were 7,208 male and 8,409 female teachers, and their salaries and those of superintendents aggregated $8,182,526. The 390 public high schools had 1,142 teachers and 26,755 students, and the two public normal schools 46 teachers and 1,372 students. The 13 colleges and universities had 309 instructors and 4,005 students; the two technical institutes had 92 instructors and 1,169 students; the three theological seminaries had 22 instructors and 111 students; the six law schools had 50 instructors and 577 students, and the four medical colleges had 124 instructors and 415 students.

Government.— Indiana is divided for administrative purposes into ninety-two counties, each of which has its county seat, courts, and local government. The chief State officers are a Governor, Lieutenant-Governor and Geologist, elected for four years each; a Secretary of State, Auditor, Treasurer, Attorney-General, Statistician and Superintendent of Public Instruction, two years each; and five Supreme Court Judges, six years each. The Legislature consists of two Houses, and is chosen biennially. The State capital is Indianapolis, which is also the largest city of the State and one of the greatest railroad centres in the United States.

History.— Indiana was explored by the French from Canada, and was first settled at Vincennes, on the Wabash River, in 1702. In that isolated spot the soldiers of Louis XIV, who formed the major part of the settlers, largely intermarried with the Indians, and became in a measure assimilated with them. Vincennes was one of the places captured by George Rogers Clark, in the Revolution, and at the end of that war Indiana, with the rest of the Northwest Territory, which had been taken by the British from the French in the French and Indian War, became the property of the United States. It was then inhabited chiefly by Indians, with a sprinkling of French and Half-Breeds, and for some years was marked with much turbulance. General Anthony Wayne was sent thither with an army to establish order, and by his victories in battle and his treaty with the Indians in 1795 he achieved the task. The frontage of the region upon the two navigable rivers, Ohio and Wabash, facilitated and encouraged colonization from the eastern States, and on May 7, 1800, Indiana was made an organized Territory. A few years later Indian depredations and massacres were renewed, and a military force was sent thither for their suppression, in 1811. The sanguinary battle of Tippecanoe, won by General — afterward President — William Henry Harrison, forced the Indians to sue for peace and gave the Territory tranquillity. On December 11, 1816, by joint resolution of Congress, Indiana was admitted to the Union as a State. The State Government was established at Indianapolis in 1825. Five regiments were sent from Indiana to the war with Mexico, and to the Union Army in the Civil War the State contributed more than 208,000 men, or more than fifteen per cent. of its total population. Since the war Indiana has been conspicuously known as a "doubtful State" in National politics, and in various Presidential campaigns has been very closely contested.

Population.— The population of Indiana at decennial periods has been as follows:—

Year.	White.	Colored.	Total.
1800	5,343	298	5,641
1810	23,890	630	24,520
1820	145,758	1,420	147,178
1830	339,399	3,632	343,031
1840	687,698	7,168	685,866
1850	977,154	11,262	988,416
1860	1,339,000	11,428	1,350,428
1870	1,656,077	24,560	1,680,637
1880	1,939,073	39,228	1,978,301
1890	2,147,189	45,215	2,192,404
1900	2,458,957	57,505	2,516,462

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In 1800 and 1810 Indiana ranked twenty-first in population among the States; in 1820, eighteenth; in 1830, thirteenth; in 1840, tenth; in 1850, seventh; in 1860, 1870 and 1880, sixth; in 1890 and 1900, eighth. The population to the square mile, averaged, was in 1800, 0.02; 1810, 0.7; 1820, 4.1; 1830, 9.6; 1840, 19.1; 1850, 27.5; 1860, 37.6; 1870, 46.8; 1880, 55.1; 1890, 61,1; and 1900, 70.1. The native and foreign-born populations have been as follows according to the last three decennial censuses:—

	1880.	1890.	1900.
Native	1,834,123	2,046,199	2,374,341
Foreign	144,178	146,205	142,121

Indiana thus belongs to the minority of States, in which the actual as well as proportionate number of foreign-born inhabitants is decreasing; a fact which is the more noteworthy in view of the great industrial interests of the State. The cities of Indiana above 25,000 population, with their rank (in parentheses) among the cities of the United States and population at the last three censuses, are as follows:—

	1880.	1890.	1900.
Indianapolis	(23) 75,056	(26) 105,436	(21) 169,164
Evansville	(65) 29,280	(55) 50,576	(64) 59,007
Fort Wayne	(73) 26,880	(85) 35,393	(83) 45,115
Terre Haute	(75) 26,042	(102) 30,217	(106) 36,673
South Bend	(124) 13,280	(136) 21,819	(109) 35,999

W. Fletcher Johnson.

INDIAN ARCHIPELAGO. The East Indian Archipelago or Malay Archipelago, the largest island cluster in the world, lies to the southeast of Asia and to the north and northwest of Australia, and bears the impress in many of its most important characteristics, both natural and historical, of this twofold relation.

As the archipelago does not form a political unity, different writers assign it very different limits, according as they are influenced by one set of considerations or another. New Guinea to the east and the Philippines to the north are sometimes included and sometimes excluded; Sumatra is sometimes regarded as the most western member of the group, and sometimes that position is given to the Nicobar or the Andaman Islands. From the following survey of the extent of the archipelago the Malay peninsula and New Guinea are excluded, but the Andaman Islands are admitted as having at least an ethnographical claim. The Balintong Strait, about the 20th parallel of N. latitude may be taken as the northern limit; and but for a small portion of the islands Timor and Sumba (Sandalwood Island), with their insignificant adjacencies, the southern limit might be stated as the 10th of S. latitude. The Andaman Islands extend almost to 93° E. longtitude, the Aru Islands as far east as 135°. The equator passes through the middle of the archipelago; it successively cuts Sumatra, Borneo, Celebes, and Jilolo, four of the most important islands. To adopt Mr. Wallace's graphic sentences (noting that he embraces New Guinea and the Solomon Islands), the archipelago "includes two islands larger than Great Britain; and in one of them, Borneo, the whole of the British Isles might be set down, and would be surrounded by a sea of forests. Sumatra is about equal in extent to Great Britain; Java, Luzon, and Celebes are each about the size of Ireland. Eighteen more islands are on the average as large as Jamaica; and more than a hundred are as large as the Isle of Wight."

The statistics of the area and population of the several islands can only be given approximately. The following table is based on statements contained in the sixth number of Behm and Wagner's *Die Bevölkerung der Erde* (Gotha, 1880):—

	Area. Sq. miles	Population.
I. Andaman and Nicobar Islands	3,192	20,000
II. Sunda and Molucca Islands	655,720	27,343,000
(1) Borneo group 295,007 sq. m.		
(2) Sumatra group 179,458 "		
(3) Java group 50,849 "		
(4) Lesser Sunda group 35,152 "		
(5) South Western group 2,021 "		
(6) Tenimber, Aru, and Ke Islands 5,356 "		
(7) Moluccas 10,549 "		
(8) Celebes group 77,250 "		
III. Philippine Islands	114,096	7,450,000
Total	773,008	34,813,000

The total area is thus rather less than that of British India, and the population rather more than that of Great Britain and Ireland.

The islands of the archipelago nearly all present bold and picturesque profiles against the horizon, and at the same time the character of the scenery varies from island to island and even from district to district. The mountains arrange themselves for the most part in lines running either from northwest to southeast or from west to east. In Sumatra and in the islands between Sumatra and Borneo the former direction is very distinctly marked, and the latter is equally noticeable in Java and the other southern islands. The mountains of Borneo rise rather in short ridges and clusters from the plain, like islands from the sea; the arrangement represented on even what are considered authoritative maps being, like much else in the cartography of the archipelago, the product of imagination. Nothing in the general physiognomy of the islands is more remarkable than the number and distribution of the volcanoes, active or extinct.

An important fact in the physical geography of the archipelago is that Java, Bali, Sumatra, and Borneo, and the lesser islands between them and the Asiatic mainland, all rest on a great submerged bank, nowhere more than 100 fathoms below the surface of the sea, which may be considered a continuation of the continent; while to the east the depth of the sea has been found at various places to be from 1,000 to 2,500 fathoms As the value of this fact has been particularly emphasized by Mr. Wallace, the limit of the shallow water, which passes through between Bali and Lombok, and strikes north to the east of Borneo, has rightly received the name of Wallace's line. The Philippines, on the other hand, "are almost surrounded by deep sea, but are connected with Borneo by means of two narrow submarine banks."

Most of the islands of the archipelago belong to that great forest-belt which girdles the earth at the equator, clothing hill, plain, and mountain with an evergreen mantle. In islands and districts where human civilization has been at work for centuries, the natural covering has in large measure given place to artificial tilth; and in Timor and several of the southeastern islands the characteristics of New Guinea—luxuriant herbage and open park-like woodlands—are more or less strikingly predominant. The field for botanical research in the archipelago is still vast and alluring. Among the very giants of the forest the unregistered species must be numerous; and, if we descend to the minor forms, it is a very poor collection that does not yield something absolutely new to science. The ferns, the pitcher plants, and the orchids are especially numerous, and have attracted particular attention. The volcano of Pangerango, in Java, is said to have, for example, yielded 300 species of ferns; and Mr. Burbidge, in a short excursion in Borneo in 1879, found upward of fifty species that had not been previously obtained in the island.

If we turn to the economical aspect of the vegetation, whether natural or cultivated, we cannot fail to be impressed by its varied resources. The list of fruits is a very extensive one; though unfortunately it is only with a very few of them that the untraveled European can have any practical acquaintance. Besides the orange, the mango, the mangosteen, the pomato or shaddock, the guava, the pawpaw, and the jack fruit, we have the rambutan, the tarippe or trap, the jintawan, the tampu, the bilimbing, the mamhangan, the langsat, the rambi, and the jambosa. The name at least of the durian is now well known (see DURIAN), and nearly as strange is the bawangutan, of which the fruit, the leaves, and the branches have all a strong odor and flavor of onions. Of what more distinctly deserve the name of food-plants the variety is equally notable. Not only are rice and maize, sugar and coffee, among the widely cultivated crops, but the cocoa-nut, the bread fruit, the banana and plantain (usually called *pisang* in the archipelago), the sugar-palm, the tea-plant, the sago-palm, the cocoa-tree (which curiously yields the favorite beverage of the Sulu archipelago), the ground-nut, the *Caladium esculentum*, the yam, the cassava, and others beside, are of practical importance. The cultivation of sugar and coffee owes its development mainly to the Dutch; and to them also is due the introduction of tea. They have greatly encouraged the cultivation of the cocoa-nut among the natives, and it now flourishes, especially in the coast districts, in almost every island in their territory. The oil is very largely employed in native cookery. The sago-palm is most abundant in the island of Ceram, but is also found growing wild in Borneo, Celebes, Timor, and other islands of the Moluccas, in the Linga archipelago, and in parts of Sumatra. The product is mainly prepared for export. Pepper, nutmeg, and cloves were long the objects of the most important branch of Dutch commerce; and camphor, dammar, benzoin, and other products of a similar kind have a place among the exports. India-rubber and gutta-percha are no longer obtained to the same extent as formerly.

To the naturalist the Indian archipelago is a region of the highest interest; and from an early period it has attracted the attention of explorers of the first rank. And yet the list of its living forms is far from being completely ascertained. The best known district is western Java, and Timor, the Moluccas, and the Papuan Islands have for the most part been well explored. Only parts of Sumatra, Borneo, and Celebes have been worked, and most of the other islands have yet to be dealt with. Zoölogically the archipelago belongs to two distinct regions—the eastern or Papuan, and the western or Malay or Indian. Six genera of the *Quadrumana*, fourteen of the *Chiroptera*, five of the *Insectivora*, fourteen of the *Carnivora*, six of the *Rodentia*, of the *Edentata* one only (*Manis*), five of Ruminants, and three of Pachyderms are enumerated. Sumatra indicates a connection with the Malacca peninsula by *Nemorhœdus*, the elephant, *Gymnura*, and the tapir. *Pithecus*, *Tarsius*, and *Ptilocercus* seem peculiar to the Sunda Islands. The Philippines have *Semnopithecus*, *Macacus*, *Cynopithecus*, *Galeopithecus*, *Pteropus*, *Taphozous*, *Vespertilis*, *Viverra*, *Paradoxurus*, *Pteromys*, *Mus*, *Rusa*, and *Cervulus*.

The ethnology of the Indian archipelago does not lack its difficult problems; but some outstanding features are easily described. There are at least two main native races, the brown, long-haired Malay and the darker-skinned, frizzly-haired Papuan. And to these more recent explorations make it almost certain that a third and probably more thoroughly aboriginal race—the Negrito—must be added, though even specialists who have had opportunities of direct observation are not unanimous in regard to this noteworthy element. The Malays are subdivided into an immense number of tribes and peoples in the most various stages of civilization, and broadly differenced from each other by physical and linguistic characteristics. Of chief note are the Malays proper, the Javanese, the Bugis, the Tagalas, and Bisayas, the people of the Moluccas, the Dayaks (mainly in Borneo), the Battaks of Sumatra, the Sulu islanders (closely similar to the tribes of northern Borneo). The Papuan race is chiefly to be found in the eastern section of the archipelago. Besides these three races, whose first connection with the archipelago dates from before the dawn of history, we have a variety of intrusive elements, traceable by more or less strictly historical documents. A Hindu strain is evident in Java and others of the western islands; Moors and Arabs (that is, as the names are used in the archipelago, Mahometans from various countries between Arabia and India) are found more or less amalgamated with many of the Malay peoples; and the Chinese form, in an economical point of view, one of the most important sections of the community in many of the more civilized districts. Chinese have been established in the archipelago from a very early date; the first Dutch invaders found them settled at Jacatra; and many of them, as, for instance, the colony of Ternate, have taken so kindly to their new home that they have acquired Malay to the disuse of their native tongue. Chinese tombs are among the objects that strike the traveler's attention at Amboyna and other ancient settlements.

There is a vast field for philological explorations in the archipelago. Of the very great number of distinct languages known to exist, few have been studied scientifically. The most widely distributed is the Malay, which has not only been diffused by the Malays themselves throughout the coast regions of the various islands, but, owing partly to the readiness with which it can be learned, has become the common medium between the Europeans and the natives. The most cultivated of the native tongues is the Javanese, and it is spoken by a greater number of people than any of the others. To it Sundanese stands in the relation that Low German holds to High German, and the Madurese in the relation of a strongly individualized dialect.

The statistics of the population are, with the exception of those for a few limited areas, such as Java, of the most unsatisfactory character. The estimate of Behm and Wagner in 1880 has been already stated—34,813,000.

Politically the Indian archipelago is subject to a sixfold division:—The independent native states and tribal territories, the Spanish possessions, the Portuguese possessions, the Dutch possessions, the English possessions, and the state of Sarawak. The Dutch are by far the most influential power in the archipelago. The Spanish authority is confined to the Philippines and the Sulu archipelago—the latter rendered tributary to them by the native sultan in August, 1878, in return for an annual subsidy of $2,400. The English, if the island of Singapore be considered as belonging rather to the Malacca Peninsula, possess only the island of Labuan (19,350 acres), acquired in 1847, though the establishment of the British Bornean Company in the north of the island may prove the beginning of a new acquisition. To the Portuguese are subject part of Timor and the island of Kambing, in all 6,192 square miles. The Dutch on the other hand claim, besides an area of 149,820 square miles in western New Guinea, a total territory in the archipelago of 566,383 square miles, or forty-four times as much as the governing country. Of the really independent native states the largest is that belonging to the sultan of Brunei (Borneo); it is estimated to have an area of about 88,000 square miles.

INDIANAPOLIS, the capital of Indiana, is situated at almost the exact geographical center of the State, 824 miles west of New York by rail, and 194 miles southeast of Chicago. It stands 721 feet above the sea-level, and 148 above Lake Erie.

On the admission of Indiana as a State into the Federal Union in 1816, Congress presented four square miles of public lands for its seat of government, to be selected by the State. The location was made in 1820 at the confluence of Fall Creek and White River. The site chosen was in the midst of the unbroken forest, sixty miles distant from the borders of civilization, and only reached by Indian trails. The name Indianapolis was given by an act of the Legislature on January 6, 1821; and Alexander Ralston was appointed to lay out the city. Selecting a slight mound near the middle of the ground as the center of the proposed capital, Ralston laid out the town after the manner of Washington city, which he had helped to survey.

Four avenues radiate from the center to the four corners of the city. The streets and avenues are 90 feet wide, except Washington, the main street, which is 120. The city has now outgrown its original limits, and extends four miles in length and three in width. It is built upon a level plain and surrounded by a fertile country. It was incorporated in 1836, and received a city charter in 1847. Its growth is shown by the following facts: — Population (1900), 169,164; assessed value of property, $123,753,030; taxes collected for the year, $876,667; total receipts (1901), $1,604,551; total expenditures, $1,606,239; total bonded debt, $2,446,600; tax levy on every $100 of taxable property, $1.95; per capita of municipal burdens, $6.82.

The growth of the city's manufacturing industries is very gratifying; in 1900 there were, in all, 1,910 establishments, with an aggregate capital of $36,828, and an output of products valued (1900) at $68,607,580. Of these industries the chief are slaughtering and meat packing, foundries and machine shops, and flouring and grist mills.

In 1847 the first railway entered the city. Within a few years thereafter other lines were constructed, until now fifteen main lines converge there. The numerous tracks being on a level with the surface of the streets, the obstruction and danger at the numerous crossings became very great on account of the increase of railway traffic, so that in 1877 a loop line, called the "Belt," had to be made passing around the city, to connect the various railroads. By means of it the "through freight cars" are conveyed past the city without blocking the traffic.

Indianapolis is in the center of the swine-producing region, and pork packing is one of the chief industries of the city. It is also largely engaged in the grain trade. The railways have been of greatest service to Indianapolis, compensating for its want of water transit. The manufacturing and mercantile interests, which are large and increasing, are the natural result of the city's extensive railroad connections.

A system of graded free schools is maintained all the year. The city school property is valued at $1,041,000. In 1871 a public library was established, and is supported by taxation. It now contains 36,461 volumes, and is rapidly increasing. The Masonic temple, Oddfellows' hall, postoffice, United States arsenal, and chamber of commerce are handsome buildings. The Marion county court house, standing on a public square in the heart of the city, was completed in 1877 at a cost of $1,411,524. The exterior is of Indiana limestone, the interior of iron and marble, with frescoed walls and ceilings. Its dimensions are 150 by 286 feet, and 240 feet to the top of the dome. The principal benevolent institutions of the State, viz., the institution for the education of the blind, that for the deaf and dumb, and the hospital for the insane, are located here; they are handsome and commodious buildings, the last having accommodations for 1,313 patients. The State reformatory for women and girls, where all female offenders are imprisoned, adjoins the city. The institution is under the management of a board of control, composed of women chosen by the governor of the State. In 1877 the State erected a handsome new State house, which was completed at a cost of $2,000,000. The city is well lighted and paved, and has water-works, three public parks, a complete system of street railroads, some thirty-five hotels, five national and two State banks, nine weekly and six daily newspapers, ninety churches and over sixty schools.

INDIAN CORN. See MAIZE.

INDIAN OCEAN. This designation is given to the portion of the oceanic area which extends northward from the great southern water-zone, between the eastern coast of South Africa and the western boundary of the partially submerged Malayo-Australian continent. But while the Atlantic and Pacific extensions from the southern water-zone — the one dividing South Africa from South America, and the other forming the wide expanse of ocean between the western coast of South America and the eastern side of the Malayo-Australian continent — are prolonged into the land hemisphere as far as the north polar area, the Indian Ocean does not extend itself northward beyond the Tropic of Cancer, where it is abruptly closed in by the great land mass of the Asiatic continent. The northwestern boundary of its basin is formed by the southeastern coast of Arabia, its northeastern by the western coast of Burmah. But, between these two parts of its border, its basin is encroached on by the southward projection of the Indian peninsula, and is thus divided into two deep gulfs, of which the western is distinguished as the Arabian Sea, and the eastern as the Bay of Bengal. Now, looking to the fact that these gulfs must have been united, at no remote period, by a transverse band of sea, covering what is now the continuous alluvial plain of Northern India, we may consider the real northern border of this basin to be the great Himalaya range, the southern slope of which must have once formed its shore-line. It is remarkable that nearly the whole of its land-border is of considerable elevation, being formed on the west by the mountainous ridge that flanks the great table-land of South Africa, on the northwest by the corresponding ridge which forms the southeastern border of the elevated plateau of Arabia, while near its eastern margin there is a nearly continuous mountain range that extends southward from Assam to the extremity of the Malay Peninsula, and is thence prolonged through Sumatra and Java.

The Indian Ocean has no definite southern limit, but is considered to terminate at the parallel which stretches between the southernmost points of the African and Australian continents, near which, about midway between these two extremes, lie the volcanic islands of St. Paul and Amsterdam. The Indian Ocean is often spoken of as divided by the equator into a northern and a southern portion.

The main basin of the Indian Ocean has an average depth of about 2,500 fathoms, increasing to 3,000 fathoms in the angle between Java and northwestern Australia, which is the deepest part of it yet sounded. Its southern border is formed by a submarine plateau, which rises in some parts to within 1,500 fathoms of the surface, and which forms the common foundation, not only of the islands already mentioned, but also of the Crozets, the Kerguelen group, Prince Edward's Islands, and the Heard Islands, all of which seem to have had a volcanic origin. This plateau, however, does not shut in the southeastern portion of the basin; for a southward extension of the depression already described follows the trend of the western and southern coasts of Australia and the western coast of Tasmania, and is continuous with the deep channel (in some parts exceeding 2,500 fathoms) between Australia and New Zealand. The western and northwestern parts of the basin, on the other hand—as the number of their island-groups would lead us to anticipate—have a much less uniform depth. In the first place, the western border of the basin is encroached on by the great island of Madagascar, which must be considered as an outlying extension of the continental platform of South Africa, the Mozambique channel being comparatively shallow; and, although the bottom, at no great distance from its eastern coast, rapidly deepens to 2,000 fathoms or more, yet this is only in a channel that separates Madagascar from a platform of about half that depth, on which are based the volcanic Mascarene Islands (Mauritius, Bourbon, and Rodriguez), and of which a northern extension forms the base of the Seychelles group. This platform then curves to the southwest, so as to pass around the north of Madagascar, forming the base of several coral islands, and thus comes into continuity with the bed of the Mozambique Channel, from which the Comoro group arises. To the north of this platform, the 2,500 fathom line follows the trend of the African coast as far as Cape Gardafui, keeping outside the island of Socotra; and a bottom of more than 2,000 fathoms (crossed by the telegraph-cable between Aden and Bombay) extends into the Arabian Sea as far as 15° N. latitude. On the eastern side of that gulf, however, the declivity from the Indian coast-line to the deepest part of the basin is much more gradual; the Maldive and Laccadive groups of coral islands rising from a comparative shallow, which extends itself a little to the south of the equator. And about half way between this platform and that of the Seychelles the bottom rises into the bank which bears the Chagos archipelago, and which divides the communication between the deeper portion of the general basin and that of the Arabian Sea into two channels of no great width. Though the 2,500 fathom line does not enter the Bay of Bengal, a considerable portion of it has a depth exceeding 2,000 fathoms. Here, again, the declivity is more gradual along the eastern margin of the gulf; and the Andaman and Nicobar Islands arise from a comparatively shallow platform that stretches between the delta of the Irawadi and the north end of Sumatra.

Currents.—The current-system of the Indian Ocean is clearly dependent upon the winds which prevail over its several parts—the seasonal reversal of the monsoons in the northern part of its area producing a corresponding modification in the direction of the surface-movement of its water, while in the southern division the constancy of the southeast trade-wind keeps up through the whole year a strong westerly equatorial current. The northeast monsoon has, of course, while it lasts, the same effect as a northeast trade-wind would exert, in producing a general southwesterly drift over the northern division of the Indian Ocean, which manifests itself in a southerly flow along all the shores it meets, viz., the southeast coast of the Indian peninsula, the southeast coast of Arabia, and the east coast of Central Africa. Besides this, a special current-movement is produced by the action of the northeast monsoon on the surface-water of the China Sea, by the drift of which to the southwest it is forced into the channel between the Malay Peninsula and Sumatra, whence it issues into the Indian Ocean, through the Strait of Malacca, as a current that crosses the Bay of Bengal and impinges against the Coromandel coast of India. By this it is deflected southward, along with the general drift already mentioned, and then courses round the southern angle of the great peninsula—partly between Ceylon and the mainland, and partly along the outer coast-line of Ceylon—into the Arabian Sea, where it merges into the general drift of the surface-water toward the African coast. The average rate of this current, as it issues from the Strait of Malacca, is thirty miles per day; along the southeast coast of India, twenty-four miles; on the east coast of Ceylon, forty miles; and along the Arabian coast, eighteen miles. But when the northeast gives place to the southwest monsoon, about the vernal equinox, the whole of this movement is reversed. The drift then commences from the African and Arabian coasts, and sets across the Arabian Sea, at the rate of about twenty-four miles a day, to the Malabar coast of India, along which a current flows in a southerly direction at the rate of about thirty miles a day. This current rounds Cape Comorin and the southern coast of Ceylon, where it sometimes attains the rate of forty-five miles a day, and passes into the Bay of Bengal, reënforcing the general northeast movement of its own water, circulating round the head of this gulf, and then undergoing a deflection by the coast-line toward the entrance of the Strait of Malacca, into which it flows at the rate of from twenty to twenty-four miles per day. When the sun crosses the equator toward the south at the autumnal equinox, so that its heating power is exerted on South Africa, the indraught of air toward that continent reproduces the northeast monsoon; and this restores the westerly drift, which extends over the Indian Ocean as far as 5° S. latitude, giving place at about that parallel to the equatorial counter-current.

The surface of the southern Indian Ocean, between the parallel of 10° S. and the Tropic of Capricorn (the precise limits varying with the season), is pretty constantly traversed by the southeast trade-wind, which gives a steady westward movement to its water, known as the south equatorial current, whose average rate is about fourteen miles per day. This meets the eastern coast of Madagascar, and that of continental Africa to the north and south of it; and, its onward flow being thus checked and deflected southward by the trend of the land, it forms a strong current which sets along the Natal coast toward Cape Colony. The strength of this current varies according as the northeast or the southwest monsoon is blowing; for the movement produced by the former reënforces it, while that produced by the latter weakens it, by deflecting northward a portion of the water which the southern equatorial current brings to the coast of Africa, and drifting it toward the Indian peninsula. When flowing with its greatest force and velocity, the Natal current is scarcely, if at all, inferior to the Gulf Stream where it issues from the Florida Strait. When passing Cape Corrientes, at the southern extremity of the Mozambique Channel, it is said to have a rate of eighty miles per day and has been even said to rush, under a rare combination of impelling forces, with a velocity of 140 miles per day. Its rate gradually diminishes, however, until, off Cape Colony (where it is known as the Agulhas current), it has a velocity of about fifty miles per day. The warmth it carries has a very important influence in ameliorating the climate of Cape Colony; for this would otherwise suffer from the importation of the low temperature brought by the Antarctic current which there meets it. When the Agulhas current is at its strongest, it carries a temperature of 79° as far west as the meridian of 15° E. But when the drift of the monsoon wind countervails that of the southeast trade, instead of reënforcing it, the temperature of the Agulhas current is lower and its force less. While a portion of this current rounds the Cape and becomes a tributary of the South African current of the Atlantic (thus carrying away the excess brought into the basin of the Indian Ocean by the Malacca current), the principal part of it is deflected to the south and east, partly by the agency of the Antartic current, but chiefly under the influence of the westerly winds or "anti-trades," that prevail throughout the southern water-zone which almost continuously girdles the globe between the parallels of 40° and 60° S. Thus there is here a pretty constant retrograde set of surface-water (corresponding with the southern connecting current of the South Atlantic), at the rate of about twenty-four miles a day, toward the western coast of Australia; and since, notwithstanding the reduction of its temperature, the water which has circulated in the Indian Ocean is still much warmer than that which forms the general mass of the easterly drift, it is probably through this excess (imparting a corresponding excess of vapor to the atmosphere above, which is condensed again by contact with the colder land) that the fogs are generated, for which the islands that lie in the course of this flow are notorious. On arriving at the shores of Australia, this drift is divided by the southwest projection of its coast-line into two streams, one of which continues its eastward course along the southern coast, while the other, turning northward, forms the West Australian current, of which the greater part, when it reaches the head-water of the southern equatorial current, is drawn into it, and thus completes the circulation of the southern Indian Ocean.

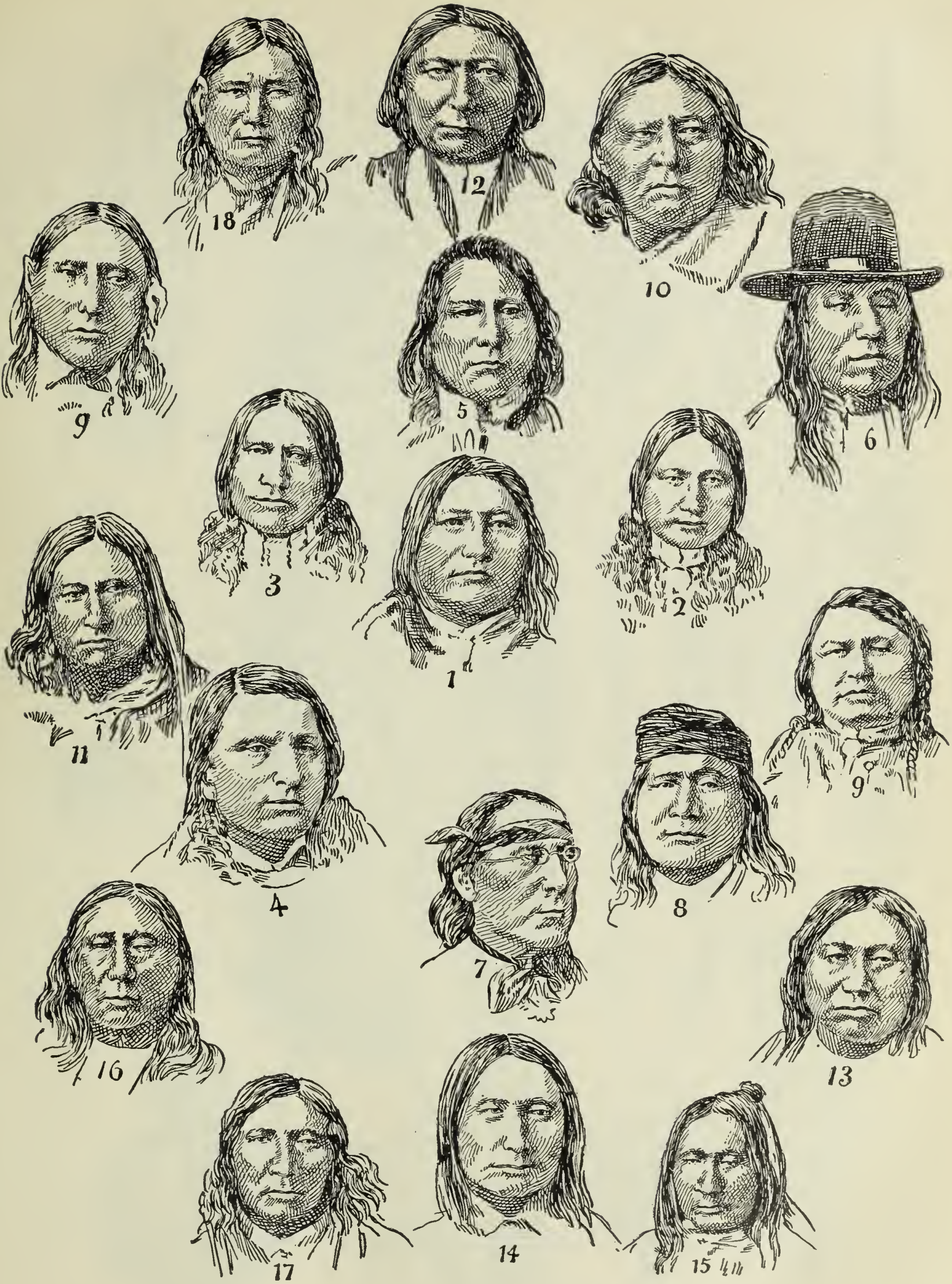
Between the parallel of 5°, to which the influence of the monsoon winds extends, and that of 10° S., which is the usual northern limit of that of the southern trade, there is a "belt of calms," wherein there runs an equatorial counter-current, which corresponds to that of the Atlantic ocean, and is, like it, to be considered as a back-water flowing toward the source from which the currents to the north and south of it derive their supplies.

INDIANS, AMERICAN. The application of the name Indians to the native peoples and tribes of the New World is an erroneous usage, originating in the belief of the Spanish discoverers of America that they had reached the eastern shores of Asiatic countries already partially known. As it happens, the name is now, even apart from the addition of American, customarily applied to the aborigines of the western hemisphere, while it is used with far less frequency as a collective name for the inhabitants of the great country of the East known from the remotest time as India.

It may be asserted with some confidence that there is nothing in the physical and mental condition of the aboriginal Americans which requires us to postulate for them a foreign origin. If man was evolved originally from several centers, America assuredly included one at least; if he sprang from a single pair, then we can even conceive that pair to have been first established in the New World, and the arguments brought forward in support of an Asiatic origin of the American would not lose their point if adduced in favor of an American origin of the Asiatic peoples.

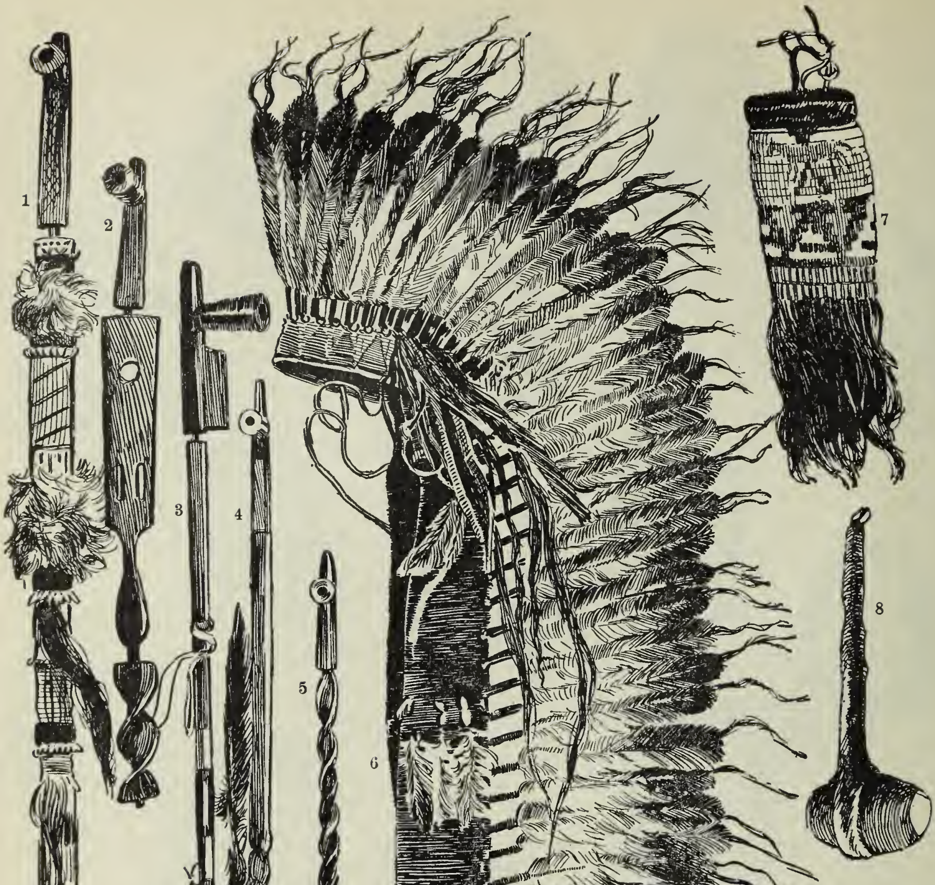
Andreas Retzius, the founder of scientific craniology, arguing on insufficient materials, grouped all the American aborigines in two great divisions—(1) a western or highland, occupying the main ranges of the Rocky Mountains and Andes, with the intervening lands thence to the Pacific; and (2) an eastern, mainly lowland, whose domain stretched from the western uplands to the Atlantic seaboard. The former, being characterized by brachycephalous or round heads, he felt disposed to connect with the brachycephalous Mongolians and Malays of Asia and Australasia. The latter, being of a decided dolichocephalous or long-headed type, he traced to possible Berber and Guanche migrations from northwest Africa and the Canary Islands, doubtless because the historical arrival of the dolichocephalous Norsemen in the New World was of too recent date to serve his purpose. But Virchow has amply shown that this classification is untenable, and it will be seen further on that there are long and round-headed types often intermingled in every part of the continent. Virchow himself, while denying the claim of the American race to be considered autochthonous, declines to commit himself as to the probable regions whence they may have reached their present habitat. The theory of an Asiatic immigration *via* Behring Strait has been somewhat revived since ethnologists have, so to say, rediscovered the lost Tchuktchis of the northeast coast of Siberia through Nordenskjöld's Swedish polar expedition of 1878–79. These Tchuktchis are supposed to form the connecting link between the races of the two worlds, and the supposition is strengthened by the *invention* of an American branch of the tribe. Professor Nordenskjöld himself remarks that "this race, settled on the primeval route between the Old and the New World, bears an unmistakable stamp of the Mongols of Asia and Eskimo and Indians of America." But Lieutenant Palander of the same expedition says that "they undoubtedly descend from the Greenland Eskimo," which would at once deprive them of all value as a connecting link, while Peschel much more probably allies them to the Itelmes (Kamtchadales), the two languages being "as closely related as is Spanish to Portuguese." W. H. Dall further points out that the Innuit (Eskimo) tongue, said to be spoken by the Tchuktchis, is merely a trading jargon, a mixture of Koriak, Tchuktchi, Innuit, English, Hawaiian, and others. It is also to be noted that the Samoyedes and other Asiatic Arctic peoples, assumed by many to be the progenitors of the Eskimo, are of Mongoloid stock and distinctly brachycephalous, while the Eskimo are the most dolichocephalous race on the globe next to the Kai Colos of Fiji. Thus the Eskimo, instead of being a connecting link, form an anthropological barrier between the populations of the two hemispheres at the very point geographically most convenient for effecting the transition.

Nor would the question be much furthered by allowing the arrival of a few barbarous tribes *via* Behring Strait in prehistoric times. Their presence would leave the Aztec, Mayan, Peruvian, and other local cultures unexplained, except as independent developments. And more recent historic migrations of Chinese, Japanese, and other civilized people, otherwise involved in tremendous difficulties, would leave equally unexplained the primeval mound-building races of the Ohio valley and the still more ancient Brazilian races of the Santa Catharina and Santos shell-heaps. Because a stray vessel has been cast ashore on the western seaboard since the discovery of America, Virchow suggests the possibility of similar arrivals in remoter times. But if the Chinese arrived so recently as even 8,000 years ago (an extreme supposition) in sufficient numbers to build up a



Faces of Noted Indians.

1. Spotted Tail, Sioux Chief, Rosebud Agency, Dakota.
2. Iron Wing, Sioux Chief, Rosebud Agency, Dakota.
3. American Horse, Sioux Chief, Pine Ridge Agency, Dakota.
4. Red Shirt, Sioux Chief, Pine Ridge Agency, Dakota.
5. White Eagle, Ponca Chief, Indian Territory.
6. Standing Buffalo, Ponca Chief, Indian Territory.
7. Poor Wolf, Mandan Chief, Fort Berthold, Dakota.
8. Son-of-the-Star, Arickaree Chief, Fort Berthold, Dakota.
9. White Man, Apache Chief, Indian Territory.
10. Stumbling Bear, Kiowa Chief, Indian Territory.
11. Tso-de-ar-ko, Wichita Chief, Indian Territory.
12. Big Horse, Cheyenne Chief, Indian Territory.
13. Bob Tail, Cheyenne Chief, Indian Territory.
14. Man-on-the-Cloud, Cheyenne Chief, Indian Territory.
15. Mad Wolf, Cheyenne Chief, Indian Territory.
16. Little Raven, Arapahoe Chief, Indian Territory.
17. Yellow Bear, Arapahoe Chief, Indian Territory.
18. Left Hand, Arapahoe Chief, Indian Territory,



1. Famous Peace Pipe.
2-3. Sioux Tobacco Pipes.
4. Tall Bull's Tobacco Pipe, Ornamented with Feathers and Scalp Locks.
5. Tobacco Pipe of the Shoshones or Snakes.
6. War Bonnet of Red Cloud, Principal Chief of the Sioux.
7. Beaded Tobacco Pouch.
8. Sioux War Club.
9. Ute Beaded Tobacco Pouch.
10. Sioux Gourd Rattle.
11. Water Jar Made of Glass and Lined with Pitch.

INDIAN TRAPPINGS

civilization in Central America, the Chinese origin of such a civilization would to this day be as self-evident as is the Chinese origin of the neighboring Japanese civilization. The foreign founders of these communities would necessarily have brought with them their arts, their domestic animals, their more useful plants and cereals, without which they must have themselves speedily perished or been absorbed in the surrounding native populations. But no trace of these things was found in the New World on its discovery. There was neither the rice of the Chinese, nor the wheat, barley, oats, or rye of the western nations, nor the iron now proved to have been known to the ancient Assyrians and Egyptians, nor the horse, camel, ox, sheep, pig, dog, or poultry of the eastern hemisphere. Instead of these, there was little beyond one cereal (maize), one esculent root (potato), one feeble beast of burden (llama), limited to the uplands of the southern Cordilleras, one species of dog elsewhere unknown. Most of the useful plants and animals of the East have since been introduced, and flourish vigorously even in the wild state, a sufficient proof that they would have been propagated had they been introduced at an earlier epoch. The knowledge of metals was limited to copper, both wrought and, in Wisconsin, apparently cast (J. S. Butler), bronze, lead, gold and silver. Otherwise most of the nations were at the discovery still in the Stone Age; and, although Virchow's assertion may be true that the most practiced archæologist will fail to detect any material difference between the stone implements of the two hemispheres, this merely implies that the arts of Palæolithic and Neolithic man were pretty much the same everywhere.

Nor is there anything in the religions, systems of government, architecture, and other arts of the native Americans, by which they can be connected with the corresponding systems of the East. That the Toltec builders of the low obtruncated Mexican pyramids were a different people from the pyramid-builders of the Nile valley, and that the mummies of the Ancon necropolis and other parts of Peru were of a different stock from the Egyptian mummies, is sufficiently evident from the texture of the hair alone. The hair of the old cultured races of America was the same as that of all the later American races, uniformly lank, because cylindrical in section. The hair of the old Egyptians, like that of the modern Fellahin, is, on the contrary, uniformly wavy, because more or less oval in section. The religions, again, of the Red Man, we are told by Carl Schultz-Sellack, Oscar Loew, and other good observers, are "essentially astrological, based on star, sun, and moon worship, with which was often associated an intricate method of measuring time built on a series of twenty constellations." "The sun," says Loew, "is the god of most Indian tribes. 'He diffuses warmth and nourishment for us and our animals; why shall we not worship him?' observed to me on one occasion Masayamtiba, a Moqui Indian (New Mexico)." This Masayamtiba was a better philosopher than those ethnologists who seek for the origin of such a simple cult in the remote corners of the globe, rather than in the beneficial influence of the heavenly bodies which shine alike for all mankind. The four great gods of the Mayas, the "props of the heavens," answered to the four great Mexican gods of the four quarters of the compass, all being associated with the four elements of wind, water, fire, and earth. But to what does either system answer in the polytheistic creeds of the Hindus, Assyrians, Babylonians, or other nations of antiquity? There is something similar in the Neo-Buddhistic teachings; but Buddhism, even of the oldest type, is much too recent to explain anything in the religious worlds of Mexico or Yucatan. The hare is associated in America, in Asia, and even among the Bushmen of South Africa with the moon. But this association was obviously suggested independently by the spots which, especially in the first quarter of the moon, seem to present the outlines of a hare on its form. Waitz well observes that a common belief in a universal flood, or in the periodical destruction of the world, whether by fire, water, storms, or earthquakes, and analogous or parallel lines of thought—taken individually—afford no proof whatever in favor of affinity, and even resemblances in several points possess only a secondary importance; for they may partly, under like conditions, arise spontaneously among peoples who have always lived in a state of separation, or may have partly resulted from periods of short intercourse between two different peoples.

In any case, these slight coincidences are of little account when weighed against the argument based on diversity of speech. The tremendous force of this argument, as applied to the American aborigines, is scarcely realized by anthropologists such as Waitz or Virchow, who have not cultivated philological studies, and it is significant that, in the already quoted paper by Virchow on the "Anthropology of America," the linguistic element is not even referred to. On the other hand, it has been greatly depreciated and even brought into contempt by the vagaries of certain etymologists, who discover affinities where there is nothing but the vaguest verbal resemblance. Science has demonstrated beyond all cavil that, while differing widely among themselves, the American languages not only betray no affinity to any other tongues, but belong to an absolutely distinct order of speech. They are neither isolating nor monosyllabic like the Indo-Chinese group, agglutinating like the Ural-Altaic, Bantu, or Dravidian, nor inflectional like the Semitic and Aryan. They come nearest in structure to the Basque, which is the only incorporating language of the Old World, but differ from it essentially, inasmuch as their capacity of incorporating words in the sentence is not restricted to the verb and a few pronominal elements, but extends in principle to all the parts of speech. This faculty, which, with one or two doubtful exceptions, seems to be characteristic of every American idiom from Behring Strait to Cape Horn, has received the name of polysynthesis, literally "a much putting together." Hence, in a comprehensive classification of articulate speech according to its inner mechanism, a special place must be reserved for the American group.

We do not intend to imply that American derives from Malayan or Dravidian, but only from some now extinct agglutinating forms of speech of which Malayan or Dravidian may be taken as still surviving typical instances. The disappearance in America of all such assumed forms, unless the Otomi of Mexico is to be accepted as a solitary lingering specimen, argues both a very great antiquity and an independent evolution of the American languages. And as the course this evolution has taken differs entirely from that pursued by the idioms of the Old World, it follows that the first peopling of America, if from the Old World, must be thrown back to a time when all speech itself was in its infancy, to a time when slow diffusion might be conceived as equally probable from an eastern or a western starting-point. It is this feature of a polysynthesis that gives the American race its first and greatest claim to be regarded as truly autochthonous, in the same sense that we regard the Mongolian and Caucasian races as truly autochthonous in Asia.

There is a general concensus among anthropologists that on the western continent we are in presence of two distinct original types, the brachycephalous an dolichocephalous. But these are no longer confined to separate geographical areas, as Retzius supposed. The very general practice of artificially flattening or otherwise deforming the skull has naturally caused less value to be attached to the craniological test in America than elsewhere. The practice has been traced back even to prehistoric times, and a clay figure recently found associated with the remains of a child by Reiss and Stübel in a grave in Ancon puts in a clear light the method adopted by the ancient Peruvians. Still, careful investigations have placed it beyond doubt that the normal skull both in North and in South America is now mesaticephalous, or of a type intermediate between the two extremes, a fact supposed to imply a general intermingling of the two primeval stocks. On the other hand, Virchow shows perfectly normal ancient and recent crania from both sides of Greenland, from El Carmen on the Rio Negro, Patagonia, from the Botocudo tribe, East Brazil, from a tumulus of Santa Fé de Bogota, and even a Peruvian mummy exhumed at Pancatambo, all of which are distinctly, in some cases extremely, dolichocephalic. In the same way he produces brachycephalic skulls from the Brazilian shell-mounds of Santos and Santa Catharina, from the barrows of the Ohio valley mound-builders, from the Carib and Araucanian tribes, and from the Pampas of La Plata, the last mentioned of an extreme type, in close proximity to the extreme dolichocephalous specimens from Patagonia. Were it safe to argue from the analogy of Britain, where the dolichocephalic builders of the long barrows seem to have preceded and afterward become intermingled with the brachycephalic builders of the round barrows (Doctor Thurman), the western continent might be supposed to have been successively occupied first by a long-headed and then by a round-headed race, which kept aloof in a few places, while more generally becoming fused in a normally mesaticephalic type. But we have in America no guide to the relative priority of the two forms of head, nor are there now any long-headed races on the eastern Asiatic seaboard whose ancestors might be taken as the precursors of the corresponding element in the West. The obvious alternative also remains, that the two forms may have become differentiated on the American continent, just as similar differentiations must, by those who do not accept the doctrine of fixity of species, be assumed to have taken place in Asia. For such an evolution America offered a more ample field even than Asia, for it is not confined to the northern hemisphere, but stretches from the Arctic nearly to the Antarctic Circle, presenting in this wide range almost every conceivable variety of climate, atmosphere, soil, and temperature.

We thus see that the two cranial forms do not necessarily militate against the possible primordial unity of the *homo Americanus*. This unity seems on the other hand implied in certain physical and mental features, common to all the native races. Of the physical traits the most important and uniform are—(1) the hair, which is always black, coarse, glossy, and long, like a horse's mane, round in transverse section and persistent to extreme old age; (2) slight beard, but always straight, never wavy; (3) eyes small, black, somewhat deep-set, always horizontal; (4) eyebrows narrow, very arched, and black; (5) prominent cheek bones and nose, the latter often very long and aquiline.

The native American being popularly spoken of as "The Red Man," it might be supposed that color should be included in this brief list of common characteristics. But, notwithstanding the general impression, there is perhaps no other region of the globe where so great a variety of color prevails. The more general tints are a copper or cinnamon brown, and olive yellow; but different tribes, grouped according to their color, show that the extremes of a deep brown, almost approaching a true black, and of a light or fair hue, almost approaching a true white, also occur, altogether independently of latitude, climate, or elevation of the land.

The same applies to stature, varying from the dwarfish Eskimo, Fuegian (mean five feet one inch), and Peruvian (mean four feet nine inches) to the gigantic Patagonian, the tallest race on the globe.

No less varied are the other physical traits, while the wide divergence of mental capacity is sufficiently indicated on the one hand by the Cherokees of the southern Alleghanies, who in 1824 invented a complete syllabic writing system, and who can reckon to a million and upward, and on the other by the Chiquitos of the Bolivian lowlands, who, D'Orbigny assures us, "cannot get beyond one (tama), after which they have nothing but terms of comparison." The only real intellectual faculty common to all the American races is that implied by the peculiar polysynthetic mechanism of their speech. But beneath this general morphological structure, the substance of the languages themselves varies greatly in all that concerns their phonetic systems, vocabularies, relational forms, syntax, and methods of combination. While, for instance, the Thlinkeet of the extreme northwest Pacific seaboard, the Apache of Arizona, the Quichua of Peru, and the Aymara of the Bolivian uplands are among the very harshest and most guttural tongues in the world, the Otuke of the Bolivian plains, the Mohave of Arizona, the Chiquito of the upper Paraguay basin, the Samucu on the north frontier of Gran Chaco, and many Amazonian dialects are distinguished by great softness, often rivaling in euphony the most musical languages of the eastern hemisphere. The linguistic families differ from each other, not only in the measure to which their polysynthesis has been developed, but even in its very character, so that while some have scarcely yet arrived at a clear differentiation of verb and noun, others, like the Iroquois, have a purely verbal, others again, such as the extinct Timucua of Florida, an exclusively nominal inflexion. In the same way some are partial to prefixes, some to suffixes, some to infixes. Many of the Californian idioms seem to be still verging on the agglutinating stage, while the just-mentioned Timucua, the Aztec, Choctaw, Shoshone, Cree, Matlalzinca, and others of the Anahuac table-land, have reached the very acme of polysynthesis, in which all the parts of the sentence often become by indefinite composition and syncope fused into one interminable "bunch-word" of from ten to fifteen syllables and upward. As these languages also differ entirely in their vocabularies, often possessing not a single root in common, it follows that they can be no more classed together than can for instance the various agglutinating tongues of the Caucasus or the Soudan.

It thus appears hopeless to look for any unity of details in the mental and physical faculties of the American aborigines. What they have in common is reducible to one physical and one mental quality, the universal texture and black color of the hair, and their polysynthetic speech. These two properties point directly at primordial unity of origin; the endless varieties of detail argue a prodigious antiquity and an independent development of the race on the American continent. The variety renders the work of classification a labor of extreme difficulty and uncertainty. Amid all these endless points of divergence, it seems impossible to find any common basis round which to group the various tribes and races, and the problem becomes further complicated by the fact that, while many of these tribes differ in speech, though evidently of one racial stock, others belonging to the same linguistic connection present the widest physical discrepancies. Within comparatively narrow areas occurs occasionally every conceivable element of confusion, as in California and the southwestern States, occupied by the morally debased and physically degraded Pah-Utes, the tall and manly Mohaves, the ferocious Apaches, the mild and intellectual Indians of the New Mexican Pueblos, some fishers and hunters, some living on roots and berries, some skilled agriculturists, all speaking fundamentally distinct languages.

It is evidently impossible in such a case to adhere throughout to any one method of classification, and the following tentative survey is consequently based partly on the linguistic and partly on the ethnical elements, but partly also on mere geographical grounds. Fortunately there are in all the divisions of the continent a few great families, occupying vast regions, in which the ethnical and linguistic elements largely coincide. Foremost among these are the sub-arctic races and the Athabascans, Algonquins, and Dakotas in the north, the Maya-Quiché in the center, and in the south the Caribs, Quichua-Aymaras, and Guaranis. These eight stocks cover jointly an area of not less than 11,000,000 of square miles, with a total aboriginal population of about 4,000,000. But the 7,000,000 of pure and mixed Indians occupying the remainder of the land, 5,000,000 of square miles in extent, are divided into a multiplicity of tribes, whose racial and linguistic affinities present problems the solution of which must long tax the utmost ingenuity of science. The total number of distinct languages alone is estimated at about 760, of which 430 are in the north and 330 in the south. In the northern division Balbi reckons, exclusive of California, thirty-two stock languages, far too low an estimate, while Rivero and Tschudi consider that of the southern idioms as many as four-fifths are radically distinct. But all such calculations are mere vague guesses at the truth; and in the present state of our knowledge it is impossible to form an estimate of the actual number of languages still current in Gran Chaco, Chiquitos, the Amazon valley, Central America, Mexico, California, the Columbia basin, regions where an extraordinary complexity of speech prevails. Nevertheless language forms on the whole perhaps the most convenient basis of classification, and without its aid it would have been impossible to determine the affinities of many wide-spread races, such, for instance, as that of the Arizona Apaches with the Canadian Chippewayans, or on the other hand to separate nations apparently closely related, like the Iroquois from their Algonquin neighbors, or the Araucanians from the Peruvians. The true relations of many tribes are, on the other hand, still doubtful, because of uncertainty regarding the languages they speak. Such are the Cheyennes, Blackfeet, and Arapahoes, classed by some with the Dakotas, by others more probably with the Algonquins. Such also are the so-called Diegueños of South California, oscillating between the Shoshone (Snake) and Yuma connections, and the Pawnees of Nebraska and Kansas grouped by Bancroft with the Shoshone, but by Morgan regarded as an independent race. So close is the physical resemblance in these and many other cases that the question must ultimately be decided by a more exhaustive study of their languages.

*PRESENT CONDITION AND DISTRIBUTION OF THE INDIANS.

In the present consideration of the American, or rather the North American Indians, the Esquimaux are omitted because they are of the Mongolian race and are treated of elsewhere in these volumes. Most of the natives of Alaska may also be thus dismissed, for the evidence of their Mongolian origin, in whole or in part, is now convincing. The aborigines of Canada and the United States, however, are true Americans, and although there are marked tribal differences among them they are obviously all of the same ethnological stock. Of their total number, about one-fourth are in the Dominion of Canada, and three-fourths in the United States. An enumeration roughly made a quarter of a century ago showed about 100,000 in Canada and 300,000 in the United States. These figures were probably too large. Later and more careful enumerations show a somewhat less number, yet there is no reason to suppose that the Indians are actually growing fewer. On the contrary, their tendency is to increase. They have long been doing so in Canada, where treatment of them has generally been more humane than in the United States, at least until the reforms effected in this country in recent years. There are those who hold, with no little reason, that despite all the talk about the "dying race" of Red Men, the Indians on this continent are to-day actually more numerous than they were when America was discovered. It is of course impossible to determine that with certainty. But there are no indications that the continent was at all thickly populated by aborigines at any time, and it is indisputable that the numbers of many of the tribes are now increasing; though others have decreased and almost disappeared.

The greatest change the Indians have suffered, as a whole, through their contact with the white race, is in the place of their abode. Very few of the eastern tribes now live where or anywhere near where they lived a century or two ago. Many of them have been removed almost across the continent. Such changes have been comparatively slight in Canada, where the Indians to-day are distributed through all parts of the Dominion, very much as of old. Thus the Micmacs and Milicetes are still to be found in New Brunswick and Nova Scotia, the Algonquin and Iroquois tribes are still dwelling in Quebec and Ontario, the Dakotas, Crees, Chippewas, Blackfeet and other western tribes remain in Manitoba and the adjacent territories, and the Assiniboines and Beavers occupy Athabasca. There has been no such attempt to remove them from one part of the Dominion to another, or to concentre them in a certain district, as has been made in the United States.

Algonquins.— The New England States have been swept almost clear of Indians. A few of the Penobscots still linger in Maine, as of old, their home being at Oldtown on the river to which they gave the name. The once mighty Mohicans and Pequots, whose history was so bloody a one in colonial days, have vanished entirely from New England, and the handful of them still existing is settled in Wisconsin. The story of the Delawares is a typical one. They dwelt in New Jersey and Eastern Pennsylvania, and established friendly relations with the early white settlers. It was with them that William Penn made his famous treaty, under which he bought and paid them for their land, whereupon they moved to new lands further west. But they presently became possessed of the idea that they had not been sufficiently paid, and so went upon the warpath against the whites. The result was the usual one. They were beaten, and driven further west, first to Ohio, then to Missouri, and finally to the Indian Territory. Now they have dissolved their tribal organization, have become citizens of the United States, and are civilized and prosperous. A few of the Montauks still linger upon Long Island, but the tribe is almost extinct. All these belonged to the Eastern Algonquins. Of the Western Algonquins, the Menominees still occupy their ancestral home in Wisconsin. Their neighbors and kinsmen, the Miamis, however, have been removed from Eastern Wisconsin to the Indian Territory and Kansas. The Sacs and Foxes have similarly been removed from Wisconsin to the Indian Territory, though a few are scattered elsewhere, in Iowa, Nebraska, and Kansas. A like disposition has finally been made of the Shawnees, after their wanderings from Wisconsin to New York and thence to Florida. Once one of the wildest of tribes, they are now among the most highly civilized. The chief tribes of the Northern Algon-

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quins are the Pottawattomies, who were driven from southern Michigan to Kansas and the Indian Territory, where they are now civilized citizens; the Ottawas, who were driven from northern Michigan from place to place by other tribes, and now, reduced to a remnant, are settled in the Indian Territory; and the Chippewas, or Ojibways, who once inhabited Michigan, Wisconsin, and Minnesota, and were the hereditary foes of the Sioux, and who are to-day one of the most numerous of existing tribes, being settled upon reservations in the same region they knew of old.

Iroquois.— The Iroquois Indians form another of the great divisions of the American aborigines. Among their best known tribes are the "Six Nations," formerly known as the "Five Nations." This celebrated confederacy had its chief seat in New York State, between the Appalachian Mountains and the Great Lakes, and consisted of the Mohawks, Onondagas, Cayugas, Oneidas, and Senecas. Later they were joined by the Tuscaroras, when the last named came up from North Carolina. These tribes, largely because of their union, and the strategic strength and rich productiveness of the region in which they made their home, held their ground longer than most others, against overwhelming numbers of hostile Indians and also against the whites. To-day they are believed to be more numerous than ever before in their history, for even at the height of their power they were small in numbers compared with their foes the Algonquins. They are, however, much scattered, some remaining in New York, some being settled in the Indian Territory, and others in Wisconsin and Canada. The Wyandots were formerly best known as the Hurons, and lived on the shore of the lake of that name. They belonged to the Iroquois division of the race, but were often at war with the Six Nations at the one side as well as with the Sioux at the other, and were decimated by such conflicts. They are now, all that are left of them settled in Kansas and the Indian Territory, most of them having abandoned tribal relations and become citizens of the United States.

Floridans.— The third grand division may be described as the Florida Nations. They occupied Florida, Georgia, Alabama and Mississippi, and their chief tribes were the Seminoles, Creeks, Choctaws, Chickasaws and Cherokees. These, after many wars and wanderings, were long ago settled in the Indian Territory, where they have for years enjoyed a considerable degree of civilization, and are known as the "Civilized Tribes." A few of the Creeks, or Muscogees, are still in Alabama and Texas, and a few Catawbas, another Florida tribe, in South Carolina.

Caddoes.— The Caddoes and other tribes formed the fourth division of North American Indians. They inhabited Louisiana, Arkansas, and the region now comprised in northern Texas and the Indian Territory. Few are left of them, and they are chiefly settled in the Indian Territory.

Sioux.— The fifth division is one of the best known in our later Indian history, chiefly through our dealings with its greatest tribe, the Sioux. We may divide the Sioux into four general groups. One consists of the Winnebagoes, whose old home was in Northern Illinois and Wisconsin, and who are now in Nebraska. The second consists of the true Sioux, or Dakotas, subdivided into Sissetons, Yanktons, Tetons, Assiniboines, and others. They are to-day the most numerous of all American Indians, and have been among the most formidable in war. Their old home was in the northwestern part of the Mississippi Valley, from Minnesota to the Rocky Mountains, and there they chiefly remain. A third branch of the Sioux comprises the Mandans, who had a considerable degree of civilization before they came into contact with the whites, living in houses and cultivating the land; the Minetars or Gros Ventres, the Crows, and some minor tribes, who mostly remain in their old homes in Dakota and Montana. The fourth branch, or Southern Sioux, comprises the Osages, who have been moved from Missouri to the Indian Territory; the Otoes and Missouris, who remain in Nebraska; the Omahas, who were moved from Minnesota to Eastern Nebraska; the Kansas, who were sent from Missouri to the Indian Territory; and the Poncas, one of the most oppressed and wronged of all the tribes, who were driven from their old home on the Red River of the North to Nebraska, and thence to the Indian Territory.

Pawnees.— The Pawnees, Arickarees and others form the sixth great division of Indians. The Pawnees were formerly on the Platte River, where they were an agricultural as well as a warlike people. They are now in the Indian Territory. The Arickarees were near them, on the Missouri River, but are now grouped with the Mandans and Gros Ventres in South Dakota.

Other Divisions.— A seventh division includes the Blackfeet and Piegans, of the far Northwest. An eighth is formed of the Oregon tribes, such as the Flatheads, Modocs, and Nez Percés, most of whom remain in their old homes, excepting the remnant of the Modocs, who were removed to the Indian Territory. The ninth division, a widely distributed one, is that of the Shoshones. The Shoshones proper remain in their old home in Wyoming, Idaho and Nevada, where they have almost invariably been at peace with the white men. The Bannacks also remain in Idaho. The Kiowas are one of the most restless of tribes, who formerly roamed throughout the whole country from the Platte River to the Rio Grande. After several wars they were compelled to settle in the Indian Territory. The savage Comanches of Texas and Apaches of New Mexico and Arizona belong to this division, though differing so widely from the peaceful Shoshones. The Navajoes, who combine the warlike qualities of the Apaches with the civilized and industrial habits of the Shoshones, may also be put in the same class.

There are numerous other tribes, apparently not directly identified with any of these classes or divisions, which are chiefly still settled in or near their old homes. Such are the Pimas, Maricopas, and others in Southern Arizona — large and well civilized tribes; the semi-civilized Moquis, of Northern Arizona; the civilized Pueblos, or town-building Indians of New Mexico; and the hopelessly degraded Diggers, Tules, and others of the Pacific coast.

The present detailed distribution of all the Indians in the United States, by States, Territories, and reservations, is as follows, according to official reports of 1903: —

W. Fletcher Johnson.

Arizona.

Colorado River Agency.— Mohave on Reserve, 510.

Under Fort Mohave School Superintendent.— Mohave at Fort Mohave, 200; Mohave near Needles, Cal., 1,000; Chemehuevi near Fort Mohave, 75; Chemehuevi in Chemehuevi Valley, 225.

Fort Apache Agency.— White Mountain Apache, 2,028.

Under Hopi Superintendent.— Hopi (Moqui), 1,860; Navajo, 1,840.

Navajo Agency.— Navajo, 14,900.

Under Farmer in charge on Navajo Extension.— Navajo, 314.

Pima Agency.— Maricopa, 360; Pima, 4,450; Papago, 680; Papago nomadic, 1,200.

Under Farmer at San Xavier.— Papago on Reserve, 523; Papago near Tucson, 340; Papago in Fresnal Valley, 679; Papago in Pima Cousty, 1,000.

San Carlos Agency.— Apache, 2,578; Apache on San Pedro, 300; Apache near Mohawk on Lower Gila River, 300; Mohave and Yuma off Reserve, 473.

Under Walapai School Superintendent.— Havasupai, 237; Walapai, 520.

Under Western Navajo Superintendent.— Moqui, 360; Navajo, 6,000; Paiute, 150.

California.

Under Farmer.— Bigger, 35.

Hupa Valley Agency, under School Superintendent.— Hupa, 412; Lower Klamath, 530.

Mission Tule River Agency.— Mission, 2,855; Tule River, 143.

Round Valley Agency, under School Superintendent.— Concow, 168; Little Lake and Redwood, 109; Nomelaki and Pit River, 78; Wailaki and Yuki, 270.

Under Fort Bidwell School Superintendent.— Paiute, 200; Pit River, 500.

Under Fort Yuma School Superintendent.— Yuma, 654.

Not Under an Agent.— Wichumni, Kawia, Pit River, and others, 9,371.

COLORADO.

Southern Ute Agency, under School Superintendent.— Capote, Moache and Wiminuche Ute — Allotted, 408 ; Unalloted, 533.

FLORIDA.

Not Under an Agent.— Seminole, 358.

IDAHO.

Fort Hall Agency.— Bannock and Shoshone, 1,364 ; Not under an agent, 200.

Lemhi Agency, under School Superintendent.— Bannock, 92 ; Sheepeater, 92 ; Shoshone, 295.

Nez Perce Agency, under School Superintendent.— Nez Perce, 1,601.

INDIAN TERRITORY.

Quapaw Agency, under School Superintendent.— Eastern Shawnee, 98 ; Miami, 119 ; Modoc, 51 ; Ottawa, 170 ; Peoria, 191 ; Quapaw, 272 ; Seneca, 358 ; Wyandot, 360.

Union Agency.— Cherokee by blood, 28,016 ; Cherokee Freedmen, 2,749 ; Chickasaw by blood, 4,659 ; Chickasaw by intermarriage, 198 ; Chickasaw Freedmen, 4,211 ; Choctaw by blood, 14,918 ; Choctaw Freedmen, 2,983 ; Choctaw by intermarriage, 205 ; Creek by blood, 9,624 ; Creek Freedmen, 4,954 ; Seminole, 2,750.

IOWA.

Sac and Fox Agency.— Sac and Fox of Mississippi, 338.

KANSAS.

Under Kickapoo School Superintendent.— Iowa, 226 ; Kickapoo, 202 ; Sac and Fox of Missouri, 82 ; Kickapoo allottees dropped from annuity roll, 58.

Under Pottawattomie School Superintendent.— Prairie Band, Pottawattomie, 602 ; Munsee (or Christian) and Chippewa, 92.

MICHIGAN.

Under Physician.— L'Anse and Vieux Desert Chippewa, 668.

Not under an Agent.— Scattered Chippewa and Ottawa, 5,587 ; Pottawattomie of Huron, 78.

MINNESOTA.

Leech Lake Agency.— Chippewa of Red Lake, 1,341 ; Mississippi Chippewa, White Oak Point, 618 ; Pillager Chippewa, Cass and Winibigoshish, 450 ; Leech Lake, 878.

White Earth Agency.— Fond du Lac Chippewa, 103 ; Mississippi Chippewa—Gull Lake, 340 ; Mille Lac (removal), 394 ; Mille Lac (Non-removal), 828 ; White Earth, 1,607 ; White Oak Point, 85 ; Pembina Chippewa, 316 ; Pillager Chippewa — Cass and Winebigoshish, 58 ; Leech Lake, 301 ; Ottertail, 712.

Not under an Agent.— Moewakanton Sioux, Birch Cooley, 150 ; elsewhere, 779.

MONTANA.

Blackfeet Agency.— Piegan, 2,041.

Crow Agency.— Crow, 1,857.

Flathead Agency.— Charlot's Band of Flathead, 150 ; Confederated Flathead, Pend d' Oreille and Kootenai, 1,260 ; Kootenai from Idaho, 79 ; Lower Kalispel, 111 ; Spokane, 70.

Fort Belknap Agency.— Assiniboin, 695 ; Gros Ventre, 535.

Fort Peck Agency.— Assiniboin, 557 ; Yankton, 1,141.

Tongue River Agency.— Northern Cheyenne, 952 ; Northern Cheyenne from Pine Ridge, 463.

NEBRASKA.

Omaha and Winnebago Agency under School Superintendent.— Omaha, 1,216 ; Winnebago, 1,102.

Santee Agency under School Superintendent.— Ponca, 236 ; Santee Sioux, 1,056.

NEVADA.

Nevada Agency under School Superintendent.— Paiute of Pyramid Lake Reserve, 642.

Under Carson School Superintendent.— Paiute of Walker River Reserve, 495.

Western Shoshone Agency, under School Superintendent.— Paiute, 270 ; Shoshone, 235 ; not under an agent, 3,701.

NEW MEXICO.

Under Jicarilla School Superintendent.— Jicarilla Apache, 774.

Mescalero Agency, under School Superintendent.— Mescalero Apache, 439.

Pueblo, under Albuquerque School Superintendent.— Acoma district, Laguna district, Casa Blanca, Encinal, Laguna, Mecita, Paguate, Paraji, Seama, 2,049 ; Isleta district, 1,200 ; San Dia district, 60 ; San Felipe district, 565 ; Santa Ana district, 100.

Pueblo, under Santa Fe School Superintendent.— Cochiti, Jemez, Nambe, Picuris, Santa Clara, Santo Domingo, San Ildefonso, San Juan, Sia, Taos, Tesuque, 3,150.

Pueblo, under Zuni School Superintendent.— Zuni, 1,547.

NEW YORK.

New York State Agency.

Allegheny Reserve.— Onondaga, 79 ; Seneca, 962.

Cattaraugus Reserve.— Cayuga, 152 ; Onondaga, 32 ; Seneca, 1,272.

Oneida Reserve.— Oneida, 150.

Onondaga Reserve.— Oneida, 120 ; Onondaga, 393.

St. Regis Reserve.— 1,208.

Tonawanda Reserve.— Cayuga, 22 ; Tonawanda Seneca, 490.

Tuscarora Reserve.— Onondaga, 46 ; Tuscarora, 364.

NORTH CAROLINA.

Under School Superintendent.— Eastern Cherokee, 1,457.

NORTH DAKOTA.

Devil's Lake Agency.— Sisseton, Wahpeton, and Pabaksa Sioux, 1,051 ; Turtle Mountain Chippewa, full blood, 236 ; mixed blood, 2,374.

Fort Berthold Agency.— Arickaree, 386 ; Gros Ventre, 459 ; Mandan, 247.

Standing Rock Agency.— Sioux (Blackfeet, Unkpapa and Yanktonais bands), 3,546.

OKLAHOMA.

Under Cantonment School Superintendent.— Arapaho, 237 ; Cheyenne, 538.

Cheyenne and Arapaho Agency, under School Superintendent.— Arapaho, 528 ; Cheyenne, 772.

Under Seger School Superintendent.— Arapaho, 133 ; Cheyenne, 605.

Kiowa Agency.— Apache, 158 ; Caddo, 534 ; Comanche, 1,401 ; Kiowa, 1,170 ; Wichita, including Delaware, Towakoni, and Keechi, 433.

Under War Department.—Apache at Fort Sill, 298.

Osage Agency.— Kansas (Kaw) 218 ; Osage, full blood, 941 ; Osage, half blood, 1,009.

Under Pawnee School Superintendent.— Pawnee, 646.

Ponca, etc., Agency.— Oto and Missouri, 367 ; Ponca, 556 ; Tonkawa, 50.

Sac and Fox Agency, under School Superintendent.— Iowa, 93 ; Sac and Fox of Mississippi, 492.

Under Shawnee School Superintendent.— Absentee Shawnee, 687 ; Citizen Pottawattomie, 1,686 ; Mexican Kickapoo, 247.

OREGON.

Grande Ronde Agency, under School Superintendent.— Clackamas, 62 ; Crow Creek, 24 ; Lakmiut, 28 ; Mary's River, 40 ; Rogue River, 52 ; Santiam, 22 ; Umpqua, 84 ; Wapeto, 18 ; Yamhill, 26.

Klamath Agency, under School Superintendent.— Klamath, 744 ; Modoc, 238 ; Paiute, 102 ; Pit River, 82.

Siletz Agency, under School Superintendent.— Chetco, Joshua, Klamath, Mikonotuni, Rogue River, Sixes or Kwatami, Yuchi, 460.

Umatilla Agency, under School Superintendent.— Cayuse, 385; Umatilla, 191; Walla Walla, 574.

Warm Springs Agency, under School Superintendent.— Paiute, Warm Spring, Wasco, and Tenino, 792.

SOUTH DAKOTA.

Cheyenne River Agency.— Blackfeet, Miniconjou, Sans Arcs, and Two Kettle Sioux, 2,481.

Crow Creek Agency.— Lower Yanktonais Sioux, 1,006.

Under Flandreau School Superintendent.— Santee Sioux of Flandreau, 288.

Lower Brule Agency.— Lower Brule Sioux, 467.

Pine Ridge Agency.— Oglala Sioux, 6,714.

Rosebud Agency.— Brule, Loafer, Lower Brule, Northern, Two Kettle, and Wazhazhe Sioux, Agency district, 1,265; Big White River district, 374; Black Pipe Creek district, 489; Butte Creek district, 899; Cut Meat district, 973; Little White River district, 561; Ponca Creek district, 411.

Sisseton Agency.— Sisseton and Wahpetou Sioux, 1,874.

Yankton Agency, under School Superintendent.— Yankton Sioux, 1,675.

UTAH.

Uinta and Ouray Agency.— Uinta Ute, 452; Uncompahgre Ute, 664; White River Ute, 356.

Under Superintendent Southern Utah School.— Kaibab Paiute, at Cedar City, 30; Paiute, at Grass Valley, 40; Paiute, at Kanosh, 100; Paiute, at Rabbit Valley, 100; In San Juan County, 100; Shivwits Band of Paiute, 150.

Under Special Agent.— Kaibab Band of Paiute, 110.

WASHINGTON.

Colville Agency.— Coeur d'Alene, 498; Columbia (Moses's band), 368; Colville, 296; Kalispel, 150; Lake, 307; Lower Spokane, 375; Nez Perce (Joseph's band), 106; Okinagan, 573; San Poil and Nespelim, 400; Upper and Middle Spokane on Coeur d'Alene Reserve, 99; Upper and Middle Spokane on Spokane Reserve, 181.

Neah Lay Agency, under School Superintendent.— Hoh, 65; Makah, 394; Ozette, 47; Quileute, 234.

Puyallup Agency, under School Superintendent.— Chehalis, 144; Georgetown, 144; Humptulip, 19; Quaitso, 61; Quinaielt; 138; Nisqualli, 153; Puyallup, 529; Sklallam at Jamestown, 236; Sklallam at Port Gamble, 85; Skokomish, 204; Squaxon, 91.

Tulalip Agency, under School Superintendent.— Lummi, 377; Muckleshoot, 158; Suquamish, or Port Madison, 172; Swinomish, 292; Tulalip (Dwamish, Snohomish, etc.), 457.

Yakima Agency, under School Superintendent.— Yakima, 2,300.

Not Under an Agent.— Nooksack, 200; Wenatchee, near Wenatchee River, 166.

WISCONSIN.

Green Bay Agency.— Menominee, 1,288; Stockbridge and Munsee, 519.

Under Oneida School Superintendent.— Oneida, 2,002.

La Pointe Agency.— Chippewa: Bad River, 833; Bois Fort, Minn., 770; Fond du Lac, 864; Grand Portage, 344; Lac Courte Oreille, 1,141; Lac du Flambeau, 751; Red Cliff, 242.

Under Wittenberg School Superintendent.— Winnebago, 1,402.

WYOMING.

Shoshone Agency.— Arapaho, 841; Shoshone, 799.

MISCELLANEOUS.

Indiana.— Miamis, 243.

Maine.— Old Town Indians, 410.

South Carolina.— Catawba, 60.

Alabama and Texas.— Cushatta and Muskogee, 470.

SUMMARY.

Population, exclusive of Indians in Alaska	[a] 263,233
Exclusive of Five Civilized Tribes.	
Population	187,966
Indians who wear citizen's dress:	
Wholly	111,703
In part	44,558
Indians who can read	49,618
Indians who can use English enough for ordinary purposes	65,689
Dwelling houses occupied by Indians	26,638
Missionaries (not reported as "Teachers" in school statistics):	
Male	285
Female	111
Church members, Indians (communicants) [b]	31,362
Church buildings	371
Contributed by religious societies and other parties:	
For education [b]	[c] $340,701
For church work and other purposes [b]	$121,961
Formal marriages among Indians	1,125
Divorces granted Indians	202
Births [b]	4,907
Deaths [b]	4,352
Suicides	17
Indian criminals punished:	
By courts of Indian offenses	1,129
By civil courts	487
By other methods	301
Whisky sellers prosecuted	541

Indian Industry.— The extent to which the Indians are now engaging in useful occupations may be seen from the following official statistics for the year 1903:—

Land cultivated during the year by Indians	acres.	391,351
Land broken during the year by Indians	do..	26,598
Land under fence	do..	1,836,245
Fence built during the year	rods..	182,539
Families actually living upon and cultivating lands in severalty		11,280
Crops raised during the year by Indians:		
Wheat	bushels..	960,939
Oats and barley	do....	843,368
Corn	do....	988,421
Vegetables	do....	404,183
Flax	do....	66,551
Hay	tons....	348,541
Miscellaneous products of Indian labor:		
Butter made	pounds..	148,267
Lumber sawed	feet..	3,973,000
Timber marketed	do...	62,256,000
Wood cut	cords..	98,199
Stock owned by Indians:		
Horses, mules and burros		328,587
Cattle		313,191
Swine		43,612
Sheep		579,361
Goats		96,518
Domestic fowls		280,819
Freight transported by Indians with their own teams	pounds..	20,176,000
Amount earned by such freighting		$87,068
Value of products of Indian labor sold by Indians:		
To Government		$476,566
Otherwise		$1,731,903
Roads made by Indians	miles..	595
Roads repaired by Indians	do...	11,675
Days of labor expended by Indians on roads		95,215

Indian Schools.— The development of the Indian school system is one of the most striking features of the recent policy of the United States Government toward this element of the population. The subject of Indian schools and Indian education is discussed in detail elsewhere in this encyclopædia (Vol. XI, Indian Affairs.) At this place it will be of interest to note the latest statistics as furnished by the Commissioner of Indian Affairs, for the year 1903:—

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[a] In the Five Civilized Tribes are enumerated only those whose names have been placed upon the approved rolls of citizenship. Several thousand applications have not yet been passed upon.

[b] Only partially reported.

[c] This includes $41,825 contributed to the following schools: Carlisle, Pa., $5,285; Lincoln Institution, Philadelphia, Pa., $6,500; Hampton, Va., $10,821; and in California, Banning, $11,522; Kelseyville, $700; and San Diego, $7,000.

Kind of School.	Number.	Capacity.	Enrollment.	Average Attendance.	Number of Employees.	Cost to Government.
Government schools:						
Nonreservation boarding....	26	7,950	8,651	7,793	742	$1,124,005.30
Reservation boarding....	91	10,482	11,209	9,794	1,230	1,473,460.53
Day..............	140	4,898	4,497	3,289	268	169,994.68
Field service.......	....	....	....	....	35	24,020.00
Total.............	257	23,330	24,357	20,876	2,275	2,791,480.51
Hampton...........	1	150	101	88	....	14,610.91
Mission schools:						
Boarding..........	44	5,102	3,484	3,097	....	8,500.00
Day..............	4	325	305	240	....	....
Public............	12	....	164	81	....	2,224.15
Aggregate.........	306	28,907	28,411	24,382	....	2,816,815.57

SUMMARY.

Capacity of boarding schools..................	23,684
Capacity of day schools......................	5,223
Number of employees in Government schools.	2,275
Male..................................	942
Female................................	1,333
Indian................................	594
White.................................	1,681
Number of employees in mission schools......	538
Male..................................	191
Female................................	347
Indian................................	22
White.................................	516
Enrollment of boarding schools................	23,445
Enrollment of day schools....................	4,966
Average attendance of boarding schools.......	20,772
Average attendance of day schools............	3,610
Cost of maintaining schools:	
To Government............................	$2,816,815.57
To other parties..........................	$340,472.08
Value of subsistence raised by schools.........	$97,146.53

The steady growth of the system is shown in the following table, which shows the number of Indian schools and average attendance from 1877 to 1903. *a*

Year.	Boarding Schools.		Day Schools. *b*		Totals.	
	Number.	Average Attendance.	Number.	Average Attendance.	Number.	Average Attendance.
1877	48	....	102	....	150	3,598
1878	49	....	119	....	168	4,142
1879	52	....	107	....	159	4,448
1880	60	....	109	....	169	4,651
1881	68	....	106	....	174	4,976
1882	71	3,077	76	1,637	147	4,714
1883	80	3,793	88	1,893	168	5,686
1884	87	4,723	98	2,237	185	6,960
1885	114	6,201	86	1,942	200	8,143
1886	115	7,260	99	2,370	214	9,630
1887	117	8,020	110	2,500	227	10,520
1888	126	8,705	107	2,715	233	11,420
1889	136	9,146	103	2,406	239	11,552
1890	140	9,865	106	2,367	246	12,232
1891	146	11,425	110	2,163	256	13,588
1892	149	12,422	126	2,745	275	15,167
1893	156	13,635	119	2,668	275	16,303
1894	157	14,457	115	2,639	272	17,220
1895	157	15,061	125	3,127	282	18,188
1896	156	15,683	140	3,579	296	19,262
1897	145	15,026	143	3,650	288	18,676
1898	148	16,112	149	3,536	297	19.648
1899	149	16,891	147	3,631	296	20,522
1900	153	17,708	154	3,860	307	21,568
1901	161	19,464	143	3.613	304	23,077
1902	163	20,576	136	3,544	299	24,120
1903	162	20,772	144	3,610	306	24,382

Indian Treaties and Agreements.—The question is frequently asked, "How many treaties have been made with the Indian tribes in the United States and ratified by the Senate?" The number of treaties made with the Indians and ratified by the Senate, including the "Fort Laramie" treaty of September 17, 1851, is only 370. These treaties may be found in the United States Statutes at Large. The Fort Laramie treaty of September, 1851, never was printed in the Statutes; but this treaty, made with the Sioux, Assiniboin, Blackfeet, Gros Ventre, Mandan, Arickara, Crow, Cheyenne, and Arapaho, was one of the most important ever made, as it fixed and determined by definite boundaries the countries claimed by each of these tribes, some of the most numerous and powerful in the country. This treaty was amended by the Senate, and the treaty as amended was agreed to by every tribe participating therein except the Crow, and yet has never been printed in the United States Statutes. It is recognized in the first article of the Yankton Sioux treaty of April 19, 1858, and frequent appropriations of money by Congress have been made under it. Another treaty, made September 23, 1805, with the Sioux was also never printed in the United States Statutes at Large.

The first treaty was made with the Delaware September 7, 1778, and the last treaty was made August 13, 1868, with the Nez Percé, though the last treaty proclaimed by the President February 17, 1870, was made as early as October 14, 1864, with the Klamath, Modoc, and Yahooskin band of Snake Indians.

By an act approved February 16, 1863, Congress declared: "That all treaties heretofore made and entered into by the Sisseton, Wahpeton, Medawakanton, and Wahpakoota bands of Sioux Indians, or any of them, with the United States, are hereby declared to be abrogated and annulled, so far as any treaties or any of them purport to impose any future obligation on the United States." Of all treaties made with the Indians of the United States from 1778 to 1868, covering a period of ninety years, this is the only instance in which the Government has abrogated or annulled an Indian treaty after it had been ratified and proclaimed by the President.

Congress, by an act approved March 3, 1871, prohibited the making of any future Indian treaty. Since that time only *agreements* have been made with the Indians, subject to the approval of Congress. The number of such agreements that have been approved or confirmed by Congress is 74. The first was made September 20 et seq., 1872, with the Sisseton and Wahpeton bands of Sioux, and the last was made March 21, 1902, with the Choctaw and Chickasaw.

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[a] Some of the figures in this table as printed prior to 1896 were taken from reports of the Superintendent of Indian Schools. As revised, they are all taken from the reports of the Commissioner of Indian Affairs. Prior to 1882 the figures include the New York schools.

[b] Indian children attending public schools are included in the average attendance, but the schools are not included in the number of schools.

*INDIAN TERRITORY is the Territory owned and occupied by the five civilized Indian nations and several smaller tribes. It is the only division of the United States which remains in possession of the aborigines.

Description.— The Territory is bounded on the north by Kansas, from which it is divided by the thirty-seventh parallel of north latitude, on the east by Missouri and Arkansas, from which it is divided by an arbitrary line nearly coinciding with the meridian of 94° 30′ longitude west from Greenwich, at the south by Texas, from which it is separated by the Red River in from 33° 40′ to 34° north latitude, and at the west by Oklahoma (which formerly was a part of the Territory) from which it is separated by a number of arbitrary longitudinal lines ranging from the 96th to the 98th meridians of longitude west from Greenwich, and by the Canadian River, the North Fork of the Canadian River, and an arbitrary east and west line. The area within these bounds is 31,000 square miles of land and 400 square miles of water. The Territory lies a little south of the geographical centre of the United States. Its surface consists chiefly of rolling prairie, with a few scattered hills of no great elevation. It is traversed by the Arkansas, Canadian, Washita, Neosho, Verdigris and other rivers, every part of it being amply watered. It is also largely well wooded. The geological structure is chiefly Permo-carboniferous, Cretaceous, Triassic, Quarternary, and Archæan. There are enormous coal deposits, and the soil is generally very fertile. The climate is mild and equable, and the rainfall varies from 30 to 50 inches a year according to location.

Resources and Products.— The coal mining interests of the territory are considerable, the output being 2,162,304 tons in 1901. The coal is bituminous, of excellent quality. There is a large lumber trade, also, supplied by the forests. The territory is, however, chiefly an agricultural region. In 1900 the Territory contained 45,505 farms, comprising 3,062,193 acres of improved land and 4,206,888 acres of unimproved land. The value of the land and buildings was $46,863,440; of the implements and machinery, $3,939,480; and of the live stock $41,378,695; making a total of farm valuation of $92,181,615. The crops raised include all the grains, hay, potatoes, tobacco, cotton, vegetables and fruit. The cotton is of exceptionally fine quality, and the yield per acre is more than that in any State save Louisiana. There are considerable manufacturing enterprises, also. In 1900 there were 789 establishments, with $2,264,265 capital, paying $553,899 in wages to 1,714 employees, using $2,225,730 worth of material, and producing goods worth $3,892,181. Flour and feed milling, cotton ginning and the manufacture of cottonseed oil are among the chief industries. The territory is crossed by several important lines of railroads. The 69 banks of the Territory had in 1902 loans and discounts amounting to $7,277,499.

Education.— Education is not as general as might be desired. In 1901, with a school population of 144,509, the enrollment was only 21,137, and the average attendance for a school year of 147 days was only 12,166. There were 656 teachers, who, with the superintendents, received $180,104 in salaries.

Government.— The territory is divided among the five civilized Indian nations, the Cherokees, Choctaws, Creeks, Chickasaws, and Seminoles. Each of these forms a little republic, with its Chief and Legislature of two Houses, and a judiciary. There is also a Congress, or international council. The Cherokees occupy the northern part of the territory, their capital being Tahlequah; the Creeks are next to the southward, their capital being Okmulgee; the Choctaws are in the southeast, with Atoka for their capital; the Chickasaws are at the southwest, with Tishomingo for their capital; and the Seminoles occupy a small territory at the west centre, with Wewoka as their capital. In the extreme northeast are numerous small tribes or fragments of tribes, including Arapahoes, Cheyennes, Kiowas, Comanches, Osages, and others. While the Indians are autonomous, the supreme sovereignty is of course exercised by the United States, and some important Federal laws are in force, especially those relating to the ownership and disposition of real estate. All the land is owned by the Indians, and they are forbidden to sell it to white men, though they may lease it to them. In late years there has been a strong and progressive movement toward abolishing the old tribal system and establishing the Indians on lands owned by them in severalty.

History.— The history of Indian Territory is in a considerable measure the history of the American Indians since the early days of the United States. Some of the tribes now settled there always occupied lands in that part of the continent, but the chief nations once were in far distant regions. Thus the Seminoles formerly were in Florida, and the remnant of them was removed to the Indian Territory only after two long and bloody wars which nearly exterminated the tribe. The Creeks, who also waged a long war, were originally in Georgia and Alabama. The Cherokees came from Georgia. The old home of the Choctaws was in southern Alabama and Mississippi, and the Chickasaws came from the northern parts of those States. The minor tribes which have been mentioned also came largely from outside the borders of the Territory.

Indian Territory originally was more than twice its present size, then comprising also what is now known as Oklahoma. The bulk of it came into the possession of the United States as a part of the Louisiana Purchase in 1803, though what is now the extreme west of Oklahoma was acquired as a part of Texas and was afterward ceded by Texas to the Federal Government. The Territory was constituted by Congress in 1834, and the various Indian nations were settled thereon. The partitioning of it occurred in 1890, when the western part of it was formed into the Territory of Oklahoma.

In 1893 the so-called Dawes Commission was organized for the reform of Indian affairs, and in 1898 the Curtis act was adopted. Under the influence of these two agencies the Territory has made rapid progress toward coming into harmony with the remainder of the country. The tribal organizations of the five nations are being abandoned, lands are being apportioned among the Indians as individuals, and the Indians are coming into ordinary citizenship in the United States.

Population.— The population of Indian Territory is growing rapidly, but chiefly through the influx of white settlers, who occupy leased lands. The total population in 1890 was 180,182. In 1900 it was 302,060. In 1891 it was estimated to be about 413,000. Of this number probably more than two-thirds are white. There is a Negro population of less than 30,000. The density of population in 1900 was 12.6 to the square mile. There are no large cities in the Territory, the largest place being Ardmore, in the Chickasaw country, with less than 6,000 population in 1900. Other towns, in addition to the capitals of the five nations already mentioned, are Vinita, Claremore, Wagoner, Muscogee, Eufala,

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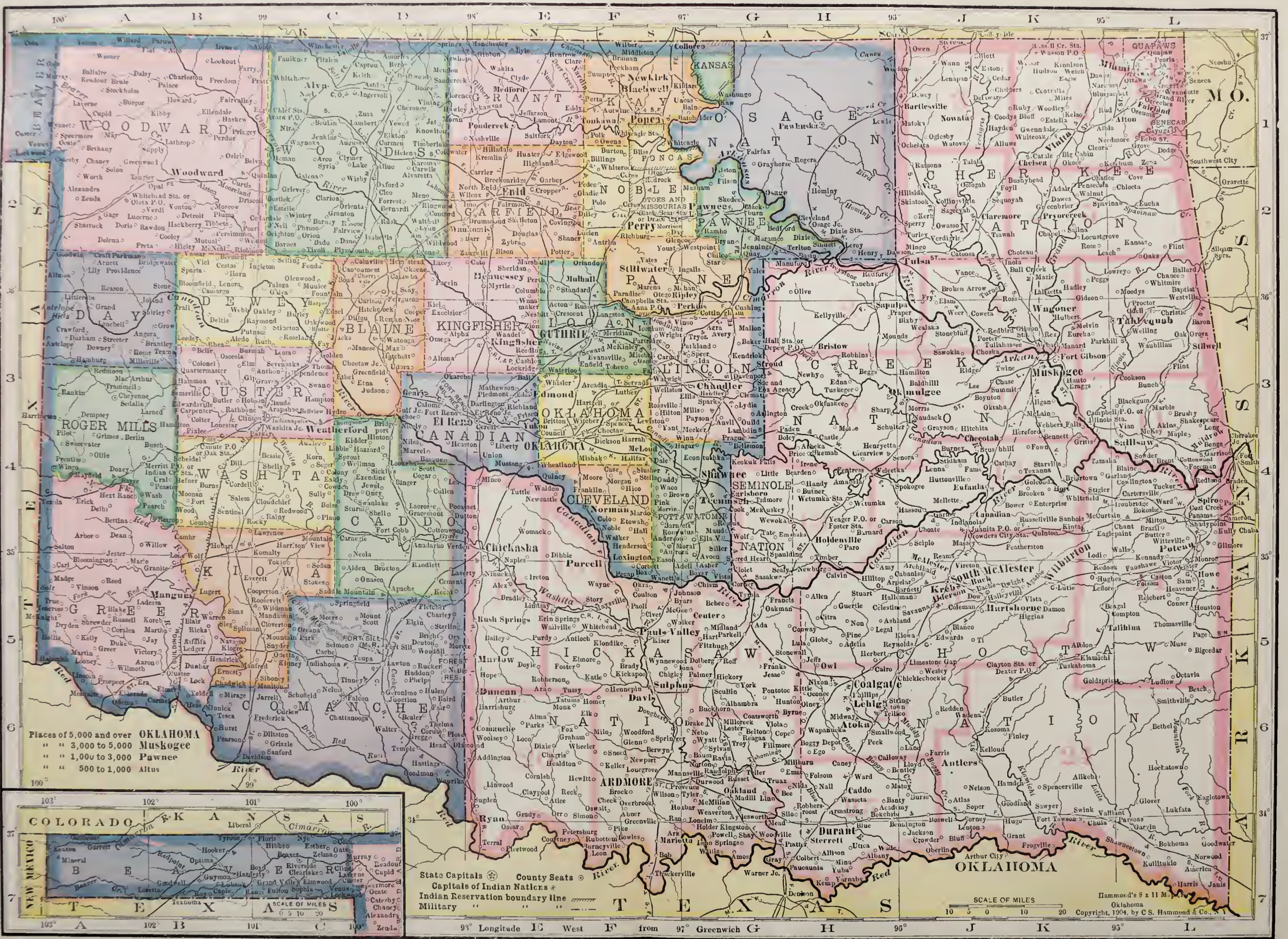


Places of 5,000 and over **OKLAHOMA**
" " 3,000 to 5,000 **Muskogee**
" " 1,000 to 3,000 **Pawnee**
" " 500 to 1,000 Altus

State Capitals ✪ County Seats ⊙
Capitals of Indian Nations ⊙
Indian Reservation boundary line
Military " " "

OKLAHOMA

Hammond's 8 x 11 Map of
Oklahoma
Copyright, 1904, by C S. Hammond & Co., N Y

McAlester, Krebs, Hartshorne, Coalgate, Lehigh, Chickasha, Duncan, Wynnewood, and Durant. These are chiefly stations on the various railroads which traverse the Territory, and most of their inhabitants are whites. W. FLETCHER JOHNSON.

INDIA-RUBBER, or CAOUTCHOUC, consists of the dried coagulated milky juice of various trees and shrubs, belonging chiefly to the natural orders *Euphorbiaceæ*, *Moraceæ*, *Artocarpaceæ*, and *Apocynaceæ*. Although a milky juice is found in plants of many other families, it does not in all cases yield caoutchouc, nor do different species of the same genus yield an equal quantity or quality of that substance. On the other hand, there are many plants which afford a good rubber, but have not yet been sought out for commercial purposes. The milky juice of plants furnishing caoutchouc is contained chiefly in the middle layer of the bark, in a network of minute tubes known to botanists as laticiferous vessels. In the *Apocynaceæ* these vessels are found also in the inner bark, or bast layer. The milky juice above mentioned possesses the properties of a vegetable emulsion, the caoutchouc being suspended in it in the form of minute transparent globules. Like other emulsions, it is easily coagulated by the addition of an acid or saline solution—alum or salt water being commonly used for this purpose, but it is said by Mr. Bruce Warren not to be coagulated by alcohol. The caoutchouc appears to be kept in suspension in the juice by means of ammonia; at least in some cases the fresh milk exhales an ammoniacal odor. Probably it is on this account that the addition of liquid ammonia prevents the juice from coagulating for a considerable length of time; and the ammonia is in certain districts added when the milk has to be carried some distance from the place of collection. The addition of salt water to the juice is to be deprecated, as it renders the caoutchouc very hygroscopic. The best rubber known is obtained by careful evaporation of the recently strained juice at a moderate heat. Trees are known to contain caoutchouc by the bark on incision yielding a milk that when rubbed between the fingers coagulates into an elastic fiber. The dried bark of such plants when broken shows between the two fractured surfaces of bark a number of silky fibers which can be stretched for some distance without breaking.

Caoutchouc differs from other vegetable products of like origin by possessing considerable elasticity, by being insoluble in water or alcohol, alkalies and acids (with the exception of concentrated nitric and sulphuric acids). Although apparently simple in constitution, it contains not only the elastic substance to which its commercial value is due, but a small quantity of an oxidized viscid resinous body soluble in alcohol. This latter substance varies in quantity in different kinds of rubber, those containing the smallest amount, such as the Pará and Ceara, being considered the most valuable, while those in which it is present in greatest proportion, such as the Guatemala and African rubbers, are the least esteemed. Rapid evaporation of the juice, or any means which prevents oxidation, tends to prevent the formation of this viscid resin.

The first notice of india-rubber on record was given nearly five hundred years ago by Herrera, who, in the second voyage of Columbus, observed that the inhabitants of Hayti played a game with balls made "of the gum of a tree," and that the balls, although large, were lighter and bounced better than the wind-balls of Castile. Torquemada, however, seems to have been the first to mention by name the tree yielding it.

In 1751 the researches of M. Fresnau, an engineer residing in Guiana, were published by the French Academy, and in 1755 M. Aublet described the species yielding caoutchouc in French Guiana. Nevertheless india-rubber remained for some time unknown in England except as a curiosity, for Doctor Priestley, in the preface to his work on perspective, called public attention to it as a novelty for erasing pencil marks, and states that it was sold in cubical pieces of one-half inch for 3s. each. India-rubber was not known as a product of Asia until 1798, when a plant, afterward named *Urceola elastica*, Roxb., was discovered to yield it by Mr. J. Howison, a surgeon of Prince of Wales Island, and soon afterward Assam rubber was traced by Doctor Roxburgh to *Ficus elastica*, Roxb. It was not, however, until the beginning of the eighteenth century that the india-rubber industry really commenced.

Notwithstanding the fact that caoutchouc-yielding trees are found in a large belt of countries around the globe, including at least 500 miles on each side of the equator, yet the demand for the best qualities of india-rubber is in excess of the supply. The varieties which are almost exclusively used when great elasticity and durability are required are the Pará, Ceara, and Madagascar rubbers.

I. SOUTH AMERICAN.—*Pará rubber* is obtained chiefly from *Hevea brasiliensis*, Müll. Arg., a large euphorbiaceous tree upward of sixty feet in height, branching from the base, and having trifoliate leaves, the leaflets being lanceolate and tapering at both ends. Other species of *Hevea*, as well as *Micrandra siphonoides* and *M. minor*, Benth., all of which grow abundantly in the moist, steamy valleys of the Amazon and its tributaries, are also used indiscriminately by the natives to furnish Pará rubber. These trees are found in different districts, but all flourish best on rich alluvial clay slopes by the side of rivers, where there is a certain amount of drainage, and the temperature reaches from 89° to 94° at noon and is never cooler than 73° at night, while rain is rarely absent for ten days together. The genus *Hevea* was formerly called *Siphonia*, and the tree named Pao de Xerringa by the Portuguese, from the use by the Omaqua Indians of squirts or syringes made from a piece of pipe inserted in a hollow flask-shaped ball of rubber.

The caoutchouc is collected in the so-called dry season between August and February. The trees are tapped in the evening, and the juice is collected on the following morning. To obtain the juice a deep horizontal incision is made near the base of the tree, and then from it a vertical one, extending up the trunk, with others at short distances in an oblique direction. Small shallow cups made from the clayey soil and dried in the sun are placed below the incisions to receive the milk, each cup being attached by sticking a piece of soft clay to the tree and pressing the cup against it. The juice, of which each tree yields only about six ounces in three days, has a strong ammoniacal odor, which rapidly goes off, and in consequence of the loss of ammonia it will not keep longer than a day unchanged, hence when it has to be carried to a distance from the place of collection 3 per cent. of liquid ammonia is added. The juice is said by Bruce Warren to yield half its weight of caoutchouc, but 32 per cent. appears to be the usual quantity. To obtain the rubber the juice is heated in the following manner:—A piece of wood about three feet long, with a flattened clay mold at one end of it, is dipped in the milk, or this is poured over it as evenly as possible. The milk is then carefully dried by turning the mold round and round in a white vapor obtained by heating certain oily palm nuts, those of *Attalea excelsa* being much preferred, and the vapor being confined within certain limits by the narrowness of the neck of the pot in which the nuts are heated. Each layer of rubber is allowed to become firm before adding another; a practiced hand can make five or six pounds in an hour. From whatever cause, the rubber thus prepared is the finest that can be obtained. The cakes when completed are, in order to remove them from the mold, slit open with a sharp knife, which is kept wet, and are hung up to dry. The flat rounded cakes of rubber made in this manner are known in the London market as "biscuits." They rarely contain more than 15 per cent. of moisture. The scrapings from the tree, which contain fragments of wood, are mixed with the residues of the collecting pots and the refuse of the vessels employed, and are made up into large rounded balls, which form the inferior commercial quality called "negrohead," and often contain 25 to 35 per cent. of impurity. An intermediate quality is known as "entrefine." Pará rubber is said to be sometimes adulterated with the juice of the Maçandaruba tree (*Minusops elata*), which might account for the great differences that have been occasionally observed in the behavior of Pará rubber in certain stages of manufacture, the coagulated juice of the *Mimusops* genus resembling gutta-percha rather than caoutchouc.

Ceara rubber is considered almost next to the Pará in value, as it is a "dry" rubber, very elastic and free from stickiness; but it often contains a quantity of wood and foreign matter arising from the mode of collecting it, the loss in washing previous to manufacture amounting sometimes to twenty-five per cent. It is the produce of *Manihot Glaziovii*, Müll. Arg., a euphorbiaceous tree common in the province of Rio Janeiro, about thirty feet high, with a rounded head of foliage, and grayish green three to seven lobed palmate leaves, somewhat resembling the leaves of the castor-oil plant in shape and size. The trees are tapped, according to Mr. R. Cross, when the trunk attains a diameter of four to five inches, *i.e.*, when they are about two years old. The mode of collecting the rubber is as follows:—After brushing away the loose stones and dirt from the root of the tree by means of a handful of twigs, the collector lays down large leaves for the milk to drop upon. He then slices off the outer layer of the bark to the height of four or five feet. The milk, which exudes in many tortuous courses, some of it ultimately falling on the ground, is allowed to remain on the tree for several days, until it becomes dry and solid, when it is pulled off in strings, which are either rolled up into balls or put into bags in loose masses, in which form it enters commerce under the name of Ceara "scrap." The amount of Ceara rubber imported in 1879 amounted to 500 hundredweight. The attempts which have been recently made to cultivate this rubber plant in India have been attended with signal success. In Rio Janeiro it grows in a rocky or stony arid region, where a short underscrub is the only vegetation, and the atmosphere is hot and dry, the temperature ranging from 82° to 90° Fahr. It is, therefore, suited for cultivation where the *Hevea* will not grow. In Ceylon it has been found to thrive at an altitude of from 200 to 3,000 feet above the sea-level. At Zanzibar and Calcutta also it succeeds well. The seeds, which have a hard, thick coat, take a year in germinating, unless the edges near the end bearing the caruncular projection are rasped off. Cuttings, provided they have a single bud, strike readily.

Pernambuco or *Mangabeira rubber* is obtained from *Hancornia speciosa*, Gom., an apocynaceous tree common on the South American plateau in Brazil from Pernambuco to Rio Janeiro, at a height of 3,000 to 5,000 feet above the sea. It is about the size of an ordinary apple-tree, with small leaves like the willow, and a drooping habit like a weeping birch, and has an edible fruit called "mangaba," for which, rather than for the rubber, the tree is cultivated in some districts. Only a small quantity of this rubber is exported, and it is not much valued, being a "wet" rubber. It occurs in "biscuits" or "sheets." The caoutchouc is collected in the following manner:—About eight oblique cuts are made all round the trunk, but only through the bark, and a tin cup is fastened at the bottom of each incision by means of a piece of soft clay. The cups when full are poured into a larger vessel, and solution of alum is added to coagulate the juice. In two or three minutes coagulation takes place, and the rubber is then exposed to the air on sticks, and allowed to drain for eight days. About thirty days afterward it is sent to market. Pernambuco rubber, as is the case with most rubbers coagulated by saline solutions, contains a large quantity of water.

Cartagena rubber comes from New Granada in the form of black sheets three-fourths of an inch thick, having a somewhat rough or "chewed" appearance, and is more or less "tarry" or sticky. It also occurs in the form of strips or small pieces pressed together in bags. Its botanical source is not known, but is thought to be a pinnate-leaved tree, a portion at least being derived, it is supposed, from *Castilloa elastica.* It loses 35 per cent. of moisture when dried.

Guayaquil rubber is imported from Ecuador in large flakes or lumps, of a whitish color in the best kinds, the inferior sorts being porous and filled with a fœtid black liquid, having an odor of cow-dung, and staining the knife and hands. It is believed to be obtained from *Castilloa elastica.* In washing for manufacture it sometimes loses up to 40 per cent. of its weight. The bulk of the two last-mentioned rubbers is exported to the United States.

II. Central American.—The source of all the principal rubbers exported from Central America is *Castilloa elastica*, Cerv., a lofty artocarpaceous tree, with a trunk three feet or more in diameter, and large, hairy, oblong lanceolate leaves often eighteen inches long and seven inches wide, those subtending the young branches being much smaller and more ovate. The tree grows most abundantly in a sporadic manner in the dense moist forests of the basin of the Rio San Juan, where the rain falls for nine months in the year. It prefers rich, fertile soil on the banks of watercourses, but does not flourish in swamps. It is found also in Costa Rica, Guatemala, Honduras, Mexico, Cuba, and Hayti, and in Panama in company with another species, *C. Markhamiana*, Collins, and on the west coast of South America down to the slopes of Chimborazo, the Cordilleras of the Andes separating the *Castilloæ* from the *Heveæ* of Brazil, according to Mr. R. Spruce.

Nicaragua rubber.—In Nicaragua the juice is collected in April, when the old leaves begin to fall and the new ones are appearing, during which time the milk is richest. The tree is tapped either in the same manner as the *Hevea*, or by encircling the tree with a simple spiral cut at an inclination of 45°, or by two spirals in opposite directions if the tree be large. At the bottom of the spiral an iron spout about four inches long is driven into the tree, and the milk is received in iron pails. A tree twenty to thirty feet high to its first branches, and about four feet in diameter, is expected to yield twenty gallons of milk, each gallon giving about two pounds of rubber. In the evening the milk is strained through a wire sieve and transferred to barrels. The milk is coagulated by the addition of the juice of the "acheté" plant (*Ipomæa bona-nox*, L.) or of another plant called "coasso." The strained juice of either of these plants, obtained by bruising the moistened herb and subsequent expression, is added to the milk in the proportion of about one pint to the gallon. If these plants are not procurable, two parts of water are added to one of the milk, and the mixture allowed to stand for twelve hours. The coagulum is next flattened out by a wooden or iron roller to get rid of the cavities containing watery liquid, and the sheets are then hung up for fourteen days to dry, when they weigh about two pounds, the sheets being usually one-half to one-eighth inch thick and twenty inches in diameter. When coagulated by water, the mass is placed in vats in the ground and allowed to dry, this taking place in about a fortnight. It is then rolled into balls. That which dries on the incisions in the tree is called bola or burucha, and is said to be highly prized in New York. The loss of Nicaragua rubber in drying is estimated at 15 per cent. It is exported chiefly from San Juan del Norte, or Grey Town, and the larger proportion goes to the United States. The *Castilloa* appears to be suitable for cultivation only in districts where the Pará rubber would grow equally well. The deciduous lateral shoots if planted will never grow erect.

West Indian rubber is the variety usually imported into England, but in comparatively small quantity only. It occurs in the form of blocks, the finest quality consisting of thin separable sheets, and the second of "scraps," usually conglomerated and containing fragments of bark. It is the best description of Central American rubber known. It is not, as its name seems to imply, produced in the West Indies, but derives its appellation from being brought over in West Indian steamers.

Honduras rubber is of good quality, and free from "tarry" matter.

Guatemala rubber is a very inferior kind and very unequal in quality; the best varieties are whitish, and the "lower" are black with a "tarry" appearance. It occurs in the form of sheets compacted together, from between which when pressed a thick, resinous fluid exudes. This when evaporated leaves a hard, resinous substance unaffected by hot water or steam. The rubber is collected from the trees as in Nicaragua, but it is poured on mats to dry, and the thin sheets are subsequently peeled off, folded into squares, and subjected to pressure to remove as much as possible of the contained moisture.

Siphocampylus Caoutchouc, Don., and *S. Jamesonianus*, D. C., Central American plants belonging to the natural order *Lobeliaceæ*, are also stated to yield rubber of good quality; and at the Philadelphia exhibition a rubber called Durango caoutchouc, obtained from a composite plant, was exhibited.

III. AFRICAN.—India-rubber is produced throughout equatorial Africa, the chief districts of export being the Gaboon, Congo, and Benguela on the west coast, and Madagascar, Mozambique, and Mauritius on the east. Africa, in respect of the large amount exported, may now be considered as taking the second place as an india-rubber producing continent.

Mozambique rubber, which is one of the most important varieties, occurs in the form of balls about the size of an orange, and "sausages," or spindle-shaped pieces, made up of slender strings of rubber wound around a piece of wood, which is eventually removed; or sometimes it occurs in smooth pieces of irregular size known as "cake" or "liver." *Madagascar rubber* consists of two qualities, the best of a pink and the inferior or "lower" of a black color, and occurs in shapeless pieces.

The other kinds included under the general name of African are amorphous lumps called "knuckles" from Congo; small "negroheads" or "balls" of scrap, and smooth cakes from Sierra Leone; small square pieces like dice called "thimbles," and others more irregular in shape called "nuts," and "small negroheads" from the Portuguese colonies; "tongues," consisting of flat pieces, usually wet and sticky, from the Gaboon; and "balls" from Liberia. African rubber as a rule possesses more adhesiveness and less elasticity than Pará rubber, and is inferior in value. Comparatively little is known of the plants yielding caoutchouc in Africa or of the mode of collection.

IV. ASIATIC.—The rubbers which enter commerce from Asia include the Assam, Borneo, Rangoon, Singapore, Penang, and Java kinds.

Assam rubber, although fairly elastic, is much depreciated in value by the careless mode of collection, and often loses, by washing at the manufactory, as much as 35 per cent. of dirt, consisting of clay, sand, or bark.

Palay rubber is the product of *Cryptostegia grandiflora*, R. Br., an asclepiadaceous plant common on the coast of India; and from *Willughbeia edulis*, Roxb., and *W. martabanica*, D. C., a rubber is obtained in Chittagong.

Borneo rubber comes to market in the form of balls or shapeless masses, internally of a white or pinkish color, and very porous and spongy, the pores being usually filled with salt water, in consequence of which it often loses 20 to 50 per cent. of its weight in drying.

In Sumatra caoutchouc is obtained from *Willughbeia firma*, and is exported to Holland. Malacca rubber is said to be obtained from *Urceola elastica*, Roxb.

Rangoon rubber and those of Penang and Java are imported into England in small quantities only, and are irregular in appearance. From its physical characteristics, a portion at least of Rangoon rubber is believed to be the produce of a species of *Ficus*, probably *F. hispida*, L. Another caoutchouc-yielding plant, *Urceola* (*Chavannesia*) *esculenta*, Benth., belonging to the *Apocynaceæ*, has, however, been recently discovered in Burmah, some specimens of which at the age of five years have stems six inches in diameter, while the crown covers an area of 200 square feet. It has been recommended for plantations as an available source of rubber, the cost of cultivation being very slight after the first year, and the profit commencing in seven years, at which age the yield is calculated to be three and a half pounds.

Penang rubber in character resembles the Assam, and may be also supposed to be obtained from a species of *Ficus*.

Java rubber is stated by Doctor De Vrij to be obtained from *Ficus elastica*. Like the Assam rubber it is dark and glossy, but it is of a deeper tint, and has occasional reddish streaks. It is said to be prepared by allowing the juice to dry on the incisions made in the tree. Singapore, Java, and Penang rubbers are much alike in character, and may be classed with the Assam rubber, having a firm texture, mottled appearance, and bright, polished surface, but varying in color in a single sample from light yellowish-white to dark brown. Java rubber is also exported to France.

Caoutchouc is obtained in the Malay archipelago from *Alstonia costulata*, Miq.; and *Alstonia scholaris*, R. Br., is likewise reported to yield it. In Fiji it has been obtained faom *Alstonia plumosa*, Labill. In North Australia caoutchouc has been prepared from *Ficus macrophylla*, Desf., and *F. rubiginosa*, Desf.; the last-named plant has been recommended by Baron Müller as suitable for cultivation, being a hardy species. None of the above rubbers are as yet known in British commerce as regular articles of trade.

The remarkable body known as india-rubber is composed of carbon and hydrogen alone, but its exact chemical nature is not by any means known with certainty. The action of cold and heat on india-rubber presents many points of interest. When exposed to a temperature approaching 0° C., it gradually loses its softness and ready extensibility, and finally becomes rigid and inelastic; but its normal condition may be restored by submitting it either to a temperature of 35° or 40° C., or to a tension sufficient to stretch it to about twice its natural length. In the latter case it is probable that the change is really due to heat arising from the physical disturbance consequent upon the act of stretching. The effects of heat are more complex and varied than those of cold; and with caoutchouc at an ordinary temperature, say 15° C., the primary effect of heat is to increase its flexibility and elasticity. This is well illustrated by the fact that a strip of rubber stretched by a weight contracts when it is heated to a temperature of about 40° C. This diminution as regards length is, however, accompanied by a more than corresponding increase in thickness, on account of the expansion in volume due to an elevated temperature. When caoutchouc is exposed to a temperature ranging between 100° and 120° C., it becomes considerably softened, and almost entirely loses its elasticity; but, if of good quality, it slowly recovers its former condition under the influence of a moderate degree of cold. When, however, the heat is pushed to 150°, it becomes viscous, and at 200° it fairly melts, forming a thick liquid which possesses the same composition as ordinary caoutchouc, but has no tendency to resume its original condition even when exposed to cold for a prolonged period. At a still higher temperature, caoutchouc yields a variety of volatile hydrocarbons; and, on subjection to dry distillation in a retort, its conversion into these bodies is tolerably complete, only a trifling carbonaceous residue remaining behind.

Caoutchouc, when pure, is odorless and nearly white, and possesses a specific gravity of .915. It is porous and cellular in texture, and absorbs from 10 to 25 per cent. by weight of water when long soaked in it. Alcohol is similarly taken up. Up to this point caoutchouc has been referred to as if it consisted of one substance only; but as a matter of fact all ordinary samples contain two distinct modifications, viz., the hard or fibrous and the soft or viscous. These two caoutchoucs are identical in composition, and similar as regards general properties and reactions. On subjecting a piece of raw caoutchouc, however, to the action of such a solvent as cold benzol, the essential difference between the two forms manifests itself. The fibrous or hard constituent merely swells up to many times its original bulk, but the viscous yields a true solution. In a high-class rubber, such as that imported from the province of Pará, the former modification is the principal factor; in a caoutchouc of low quality, such as "African tongue," the latter. Freshly cut surfaces of caoutchouc unite together firmly, and this circumstance is due to the presence of the viscous variety; vulcanization, by hardening this, destroys the adhesive property.

Certain liquids, such as benzol and its homologues, carbon disulphide, petroleum, ether, volatile oils, chloroform and melted naphthalene, dissolve caoutchouc more or less perfectly; but unless the substance has been subjected to the process of mastication, its fibrous constituent appears, not to disssolve in the strict sense of the term, but rather to swell up, forming a paste analogous to starch which has been acted on by hot water. Carbon disulphide and chloroform, however, exercise a more powerful solvent action on the fibrous parts of india-rubber than benzol or essential oils; and Payen has found that carbon disulphide to which 5 per cent. of absolute alcohol has been added forms one of the best solvents. One part of masticated caoutchouc dissolved in thirty parts of this solvent forms a liquid which can be filtered through paper, and which leaves a film of exquisite tenuity and purity when allowed to dry on a level glass plate.

Most fatty matters exercise a remarkable destructive action on caoutchouc, causing it to become first soft, and afterward hard and brittle. It has often happened that traces of fatty oils in the liquids employed for dissolving india-rubber, or fatty matters in the textile basis, have led to the destruction of waterproof goods. A like cause has in many cases led to the rapid deterioration of the caoutchouc threads in elastic webbing.

In the industrial working of india-rubber, the first matter to be attended to is the removal of the various impurities present in the crude material. These are in some cases natural products which have originated with the caoutchouc, while in other cases they owe their presence to careless collection or to adulteration. Among the impurities of the former class may be mentioned various gum-like or mucilaginous matters, and acid products arising from their decay or oxidation.

All impurities are in actual practice very efficiently removed by the following process:—The lumps of crude caoutchouc are first softened by the prolonged action of hot water, and then cut into slices by means of a sharp knife, generally by hand, as thus any large stones or other foreign substances can be removed. The softened slices are now repeatedly passed between grooved rollers, known as the washing rollers, a supply of hot or cold water being made to flow over them. Solid impurities speedily become crushed, and are carried away by the water, while the rubber takes the form of an irregular sheet perforated by numerous holes. The washed product contains in its pores a notable proportion of water, which is removed by hanging the rubber for some days in a warm room. It is now ready either for incorporation with sulphur and other solid bodies, or for agglomeration into solid masses by means of the masticating machine, an apparatus which consists of a strong cylindrical cast-iron casing, inside which there revolves a metal cylinder with a fluted or corrugated surface. Some of the rubber having been placed in the annular space between the inner cylinder and the outer casing, the former is made to revolve; and the continued kneading action to which the rubber is subjected works it into a solid mass, something like a gigantic sausage. Before commencing the mastication it is generally necessary to warm the apparatus by means of steam; but as the operation proceeds the heat produced requires to be moderated by streams of cold water flowing through channels provided for the purpose. The inner cylinder is generally placed somewhat eccentrically in the outer casing, in order to render the kneading more perfect than would otherwise be the case.

To convert the masticated rubber into rectangular blocks, it is first softened by heat, and then forced into iron boxes or molds. The blocks are cut into thin sheets by means of a sharp knife, which is caused to move to and fro about two thousand times per minute, the knife being kept moistened with water, and the block fed up to it by mechanical means. Cut sheets are largely used for the fabrication of certain classes of rubber goods, these being made by cementing the sheets together with a solution of rubber in coal-naphtha or benzol. Most articles made of cut sheet rubber would, however, be of very limited utility were they not hardened or vulcanized by the action of sulphur or some compound of that element. After vulcanization, rubber is no longer softened by a moderate heat, a temperature of 160° C. scarcely affecting it, nor is it rendered rigid by cold, and the ordinary solvents fail to dissolve it. It must, however, be distinctly understood that it is not the mere admixture, but the actual combination of sulphur with india-rubber that causes vulcanization. If an article made of cut sheet be immersed for a few minutes in a bath of melted sulphur, maintained at a temperature of 120° C., the rubber absorbs about one-tenth of its weight of that element, and, although somewhat yellowish in color from the presence of free sulphur, it is still unvulcanized, and unaltered as regards general properties. If, however, it be now subjected for an hour or so to a temperature of 140° C., true combination sets in, and vulcanized caoutchouc is the result.

The ordinary mackintosh or waterpoof cloth is prepared by spreading on the textile fabric layer after layer of india-rubber paste or solution made with benzol or coal-naphtha. If cotton or linen is used, it is usual to incorporate sulphur with the paste, and to effect vulcanization by steam heat; but, when silk or wool is employed, no sulphur is added to the paste, the dried coating of rubber being merely brought into momentary contact with the mixture of chloride of sulphur and carbon disulphide already mentioned. Double texture goods are made by uniting the rubber surfaces of two pieces of the coated material. Air goods, such as cushions, beds, gas bags, and so forth, are made of textile fabrics which have been coated with mixed rubber either by the spreading process above described, or by means of heated rollers, the curing being then effected by steam heat. The manufacture of overshoes and fishing boots is an analogous process, only the canvas base is more thickly coated with a highly pigmented rubber of low quality. The articles are first fashioned by joining the soft material; they are then varnished, and afterward cured in ovens heated to about 135° C. The fine vulcanized "spread sheets" are made by spreading layers of india-rubber solution, already charged with the requisite proportion of sulphur, on a textile base previously prepared with a mixture of paste, glue, and treacle. Vulcanization is then effected by steam heat, and, the preparation on the cloth being softened by water, the sheet of rubber is readily removed. The required thickness of the spread sheet is very often secured by the rubber-faced surfaces of two cloths being united before curing. The threads used in making elastic webbing are usually cut from spread sheets. The manufacture of springs, valves, and washers does not require any very special notice, these articles being generally fashioned out of mixed rubber, and vulcanized either in molds or in powdered French chalk. Rollers are made to adhere to their metal spindles by the intervention of layers of ebonite, and after vulcanization they are turned. In order to make spongy or porous rubber, some material is incorporated which will give off gas or vapor at the vulcanizing temperature, such as carbonate of ammonia, crystallized alum, and finely-ground damp sawdust. Uncombined sulphur is injurious, and often leads to the decay of vulcanized goods; but an excess of sulphur is generally required in order to insure perfect vulcanization. Sometimes the excess is partially removed by boiling the finished goods with a solution of caustic soda, or some other solvent of sulphur. In other cases the injurious effects of free sulphur are obviated by using instead of it a metallic sulphide—generally the orange sulphide of antimony; but, for the best result, it is necessary that this should contain from 20 to 30 per cent. of uncombined sulphur.

INDICTMENT is a formal accusation in writing, laid before a grand jury, and by them presented on oath to a court of competent jurisdiction. It is thus distinguished from a mere presentment by the grand jury made on information within their own knowledge, and from an INFORMATION (*q. v.*), by which a prosecution is instituted at the suggestion of a public officer without the intervention of a grand jury. The grand jury hears in private the witnesses in support of the application, and if it considers that a *prima facie* case has been made out, it is its duty to find the indictment "a true bill." Otherwise it sends the indictment into court with a finding of "no bill." In this case the indictment is said to be ignored. An indictment is said to consist of three parts—the commencement or caption, the statement of the facts constituting the crime, and the conclusion. In each part appropriate and highly technical language is still used, but verbal precision is not so essential as it once was, and departure from the ordinary formalities, if it involves no misapprehension or mistake, does not generally make a flaw in the indictment.

INDIGO is a well known and exceedingly valuable blue dyeing material. The substance has been known among Western communities from an early period, being mentioned by Dioscorides and by Pliny as *Indicum;* when it made its appearance in England it was called indico. As all these names show, the material in its origin and production is closely related to India, among the commercial commodities of which it has always occupied a distinctive and important place. It was not, however, till after the establishment of the Cape route to India that indigo came to be largely used in the dyeing establishments of Western Europe, woad having in earlier times been utilized for purposes to which indigo was subsequently applied.

As a commercial substance indigo is entirely obtained from the vegetable kingdom, although it may be produced, in minute quantity, from a principle contained in urine, and its synthetical formation has also been accomplished. The number of plants from which indigo may be procured is known to be large, but only from a very few is it prepared in practice. These are various species of the leguminous genus *Indigofera*, especially the four species *I. tinctoria*, *I. Anil*, *I. disperma*, and *I. argentea;* and it is said that in China *Polygonum tinctorium* and other nonleguminous plants are used as the source of *lan* or Chinese indigo. The woad plant, *Isatis tinctoria*, owes its value as a dye to the presence of indigo matter, although indigo is not actually prepared from it. The most important source of indigo, and that most generally cultivated, is *I. tinctoria*, which is an herbaceous plant growing three to five feet high, and having bipinnate leaves. It is in the leaves that the indigo-yielding principle chiefly resides, and these are most gorged with it at the period when the flower-buds are about to open. It is then that the plant is cut down; and in some regions the same stock yields in one year a second and even a third crop of stems.

Two principal methods of preparing indigo are pursued—dried leaves being operated on in the one, while the fresh green stalks and leaves are used in the other. It will be sufficient to describe the latter, the more important process, as it is conducted in Bengal, where the most highly esteemed varieties of indigo are made. The cut leaves and stems are tied up into small bundles and conveyed at once to the factory, in which there are two ranges of large tanks or vats, one series being at a lower level than the other. In the upper or fermenting vats the bundles are submerged; and cross-bars are fixed over the vats. A fermentation more or less rapid ensues, its completion occupying, according to the temperature, from nine to fourteen hours. The progress of the operation is judged by the tint assumed by the water, which under favorable conditions should at the end of this stage be of a fine, clear, yellow color. In this condition the liquid is run off into the lower vats, in which it is necessary to maintain it in a state of violent agitation. For this purpose a number of men, armed with long bamboos, enter the vats and lash the water incessantly for two or three hours, thus constantly exposing new surfaces to the air. Gradually the liquid assumes a green color, and indigo appears in broadish flakes, which as it forms begin to sink. After this transformation is complete, the liquid is allowed to settle, and as the indigo sinks, the clear liquid is drawn off in a series of discharges by pipes at different heights in the vat. The deposit of indigo is then placed in a boiler, and, to prevent any further fermentation, is raised to the boiling point. After resting for about a day, it is boiled for three or four hours, and then filtered over a thick filtering cloth, and the paste is dried by pressure. The cakes formed during the pressing are then put away to dry gently in the shade, and in a few days are ready for packing.

Bengal indigo of good quality forms a porous earthy mass, light and easily pulverized; and when newly fractured it has that brilliant purple-blue color distinctively known as indigo, with a kind of coppery luster. Experts distinguish upward of forty qualities of Bengal indigo, principally characterized by varying shades of color, the inferior qualities being dull in hue, with greenish or grayish tones, hard, dense, and not readily broken. The varieties of indigo which come into the American markets are classified according to their sources; the classes most frequently met with are Bengal, Oude, Madras, Manila, Java, Egypt, Guatemala, Caraccas, Mexico, and Brazil. The best qualities are the Bengal, Java, and Guatemala.

INDIUM, a metal discovered with the aid of the spectroscope in 1863 by Reich and Richter when testing certain specimens of Freiberg zinc-blende for thallium. Instead of the brilliant green line characteristic of this latter metal, they observed an intense indigo-blue line occupying a position different from that of any known line, and were thus at once led to suspect the presence of a previously unknown element. The name indium was chosen for the metal, when they succeeded in isolating it, on account of this circumstance. It has since been detected in blendes from various sources, but always in extremely minute amount, and still remains one of the rarest of the elements. Indium is best prepared from crude zinc made from indium-containing blendes. As it is less positive than zinc, if the crude zinc is treated with insufficient hydrochloric acid to dissolve it completely, a residue is obtained containing all the indium together with several other metals also present in small quantity in the zinc.

INDORE, or the Territories of the Mahárája of Holkar, is one of the principal native states in India, under the Central India Agency. The name of the state is taken from that of the capital Indore. The territory consists of many isolated tracts; but since 1861 arrangements have been made to concentrate the state as much as possible, and lands which were formerly held by Holkar in Ahmednagar district and in the Deccan have been exchanged for districts and *párgánás* bordering on the Nerbudda (Narbadá) river and the tract in which Indore town is situated. The area of the whole of Holkar's territories is estimated at 8,400 square miles. Of these districts, those situated to the north are drained by the river Chambal and its feeders, those to the south by the Nerbudda. The tracts are fertile, producing in abundance excellent wheat and other grains, pulse, sugar-cane, cotton, and opium. The poppy is so generally cultivated that, when in bloom, it gives the country the appearance of a vast garden. Tobacco is also grown to a great extent, and is of admirable quality. Pop. (1901), 1,150,000.

Besides the ruling tribe of Marhattás, the population comprises many other classes of Hindus, a few Mahometans, and a considerable number of Gonds and Bhíls.

INDRE, a department of central France, consisting of parts of the old provinces Bas-Berry, Orléanais, and Marche, is bounded north by the departments of Indre-et-Loire and Loir-et-Cher, east by Cher, south by Creuse, Haute-Vienne, and Vienne, and west by Vienne and Indre-et-Loire. It derives its name from the river Indre, which flows through it from southeast to northwest. The total area is 2,624 square miles, and the population is 296,147.

INDRE-ET-LOIRE, a department of Central France, consisting of parts of the old provinces Touraine, Orléanais, Anjou, and Marche, is bounded north by the departments of Sarthe and Loir-et-Cher, east by Loir-et-Cher and Indre, south and southwest by Vienne, and west by Maine-et-Loire. It derives its name from the Loire and its tributary the Indre, which flow through it. The total area is 2,360 square miles, and the population (1901) was 334,073.

INDULGENCE, in Roman Catholic theology, is defined as the remission, in whole or in part, by ecclesiastical authority, to the penitent sinner, of the temporal punishment due for sin. The word (from *indulgeo*, and perhaps connected with *dulcis*) in its classical use has the meaning which it still bears in ordinary parlance; but by post-classical writers it is often employed in a more special sense to denote a remission of taxation or of punishment.

Indulgences are either general or particular, *i.e.*, either open to the whole church or confined to particular localities. The most general of all is that which is proclaimed in the year of jubilee. Indulgences again are either plenary or non-plenary, the former being a total remission of all the temporal punishment which may have been incurred by the recipient. It must carefully be borne in mind that, in Roman Catholic orthodoxy, indulgence is never absolutely gratuitous, and that those only can in any circumstances validly receive it who are in full communion with the church, and have resorted to the sacrament of penance, in which alone, after due contrition and confession, provision is made for the remission of the graver penalty of sin. The doctrine of indulgences, however, is singularly open to misunderstanding; and in its practical applications it has too often been used to sanction the most flagrant immorality. The scandalous abuses connected with the "pardoner's" trade, and in particular the reckless conduct of the hawkers of the papal indulgence granted to those who should contribute funds for the completion of St. Peter's, Rome, were, as is well known, very prominent among the proximate causes of the Protestant Reformation. In the 14th article of the Church of England the doctrine of the "thesaurus meritorum" or "thesaurus supererogationis perfectorum" is by implication rejected; and in article 22 "the Romish doctrine concerning purgatory and pardons" is expressly condemned. It is hardly necessary to add that "the power of the keys" is inseparable from the idea of a church, and that in this power is plainly involved a certain discretion as to the time and manner in which discipline shall be administered. This discretion is claimed by every organized body of Christians.

INDUS, one of the three greatest rivers of northern India, rises in unknown regions on the northern slopes of the sacred Kailas Mountain in the Himálayas. On the south of this same hill rises the Sutlej, the great feeder of the Indus, which unites with it after a separate course of about 1,000 miles. The Indus rises in 32° N. latitude and 81° E. longitude, enters the Punjab in 34° 25′ N. latitude and 72° 51′ E. longitude, leaves the Punjab in 28° 27′ N. latitude and 69° 47′ E. longitude, enters Sind in 28° 26′ N. latitude and 69° 47′ E. longitude, and finally falls into the Arabian Sea in 23° 58′ N. latitude and 67° 30′ E. longitude. The basin of the Indus is estimated at 372,700 square miles, and its total length at a little over 1,800 miles.

The delta of the Indus covers an area of about 3,000 square miles, and extends along the coast-line for 125 miles. It is almost a perfect level, and nearly destitute of timber, the tamarisk and mangrove alone supplying fuel. In the marshy portions good pasturage is obtained, and in the drier rice grows luxuriantly. The climate of the delta is cool and bracing in the "winter" months, excessively hot in the "summer," and most healthy during the floods.

The Indus begins to rise in March, attains its maximum depth and width in August, and subsides in September. The registered rise at Gidu-Bandar is fifteen feet. Fish abound—at the mouths, the saltwater varieties, notably the *Clupea neowhii*, a species of herring; the chief of the freshwater varieties is the *pala*. The local consumption and export of the dried *pala* are both very large. The boats of the Indus are the *dúndhi* and *zaurak* (cargo boats), the *kauntál* or ferry boats, and the *dúndo* or fishing boats.

INDUSTRIAL EXHIBITIONS. Exhibitions of the agricultural products, mechanical inventions and works of art of different countries have grown from small beginnings within the past century and a half. Their prototypes may be found in the annual market fairs of the Middle Ages, and a survival of the original may still be noted at Nijni-Novgorod, which for a few weeks of every year becomes a populous town, its bazaars thronged by a hundred thousand visitors of many races. In 1761 the London Society of Arts gave an exhibition of pictures which has been held annually ever since. Agricultural fairs in the United States began with one given in 1804 at Washington, D. C., and have spread to every State in the Union. France, as becomes an artistic nation, was the first to inaugurate exhibitions of porcelain, tapestry, and other high-class productions. During the first half of this century national exhibitions, covering many branches of art, science, manufactures and national products, were held in European countries, and at New York and Washington. But the era of great national and international displays, which culminated in the Columbian World's Fair, by which the United States celebrated the quadrocentennial of the discovery of the continent, must be properly held to have begun with the great English exhibition held in Hyde Park, London, in 1851. This was the first "International" or "World's Fair," and was an enormous success, both from an educational and a financial stand-point. At this exhibition the combination of iron and glass in the construction of the exhibition halls was first introduced on a gigantic scale. The main building was 1,848x408 feet, with a floor area of almost a million square feet, and nearly 14,000 exhibitors contributed to make it the finest and fullest display up to that time known.

The New World followed with the second of the international series, held at New York in 1853. This, although on a much smaller scale than its London predecessor, was valuable as being the first great exhibit of American industries. Paris in 1855, London in 1862, Paris again in 1867, and Vienna in 1873, presented exhibitions of great merit and importance, the second exhibition at Paris and the display at Vienna outranking anything of the kind in history. All of these, however, were to be eclipsed in turn by the Centennial Exposition of the world's industries held at Philadelphia in 1876. A space of 260 acres in Fairmount Park was devoted to this magnificent exhibition, at which, for the first time, the immense progress in arts and science, in machinery and the products of the soil and the mine, made by the United States, were made manifest to the world at large. There were 147 structures devoted to the uses of this exposition, of which the chief were the Main Building, Agricultural Hall, Machinery Hall, Horticultural Hall, Memorial Hall, the Woman's Pavilion, and the Government Building. The main building was 1,880x464 feet, with a floor area of 20 acres; its main avenue being 1,832 feet long and 120 feet wide, with two side avenues of the same length, and 100 feet wide. The building was constructed of wrought-iron columns supporting trusses of the same material; the sides of glass, resting on brick. Of the nearly 700,000 feet taken by exhibitors, 310,000 feet were devoted to exhibits from the United States. Machinery Hall was 1,402 x 306 feet, with a floor area of 15 acres, and Agricultural Hall furnished 10 acres of room for exhibits. Thirty-six foreign governments accepted the invitation of the United States to participate in this great display, which was opened on May 10, 1876, and remained open for six months. More than 40,000 exhibitors contributed, and almost 10,000,000 of visitors attended.

Two years later Paris gave her third exhibition, surpassing in size all previous efforts, and only to be excelled by Paris herself in the display made during 1889. The 1878 exhibition had 80,000 exhibitors and 16,000,000 visitors, and its buildings covered eighty acres. The great Exposition of 1889, which was visited by thousands of Americans, undoubtedly excelled, in richness and variety, in magnitude and in success, all previous efforts. It was held in the Champ de Mars, and one of its most noticeable features was the great Eiffel tower, almost 1,000 feet in height. Other expositions, more limited in their scope, have been held at South Kensington, London, and in many European cities. In 1881 Atlanta, Ga., and in 1883 Louisville, Ky., gave fine displays of Southern products, and in 1884–85 New Orleans made a grand exhibit at the "World's Industrial and Cotton Centenary Exposition." Beginning about 1890, preparations were begun for a World's Fair which was to transcend all predecessors; and illustrate to the entire earth the triumphant advance of the United States in every branch of art and science; to the end that the year 1893 should usher in the greatest world's fair of all time. SEE WORLD'S FAIR in the Supplement.

INFANT, in law, is a person under full age, and therefore subject to certain disabilities not affecting persons who have attained full age. The period of full age varies widely in different systems, as do also the disabilities attaching to nonage. In Roman law, the age of puberty, fixed at fourteen for males and twelve for females, was recognized as a dividing line. Under that age a child is under the guardianship of a tutor, but several degrees of infancy are recognized. The first is absolute infancy in the literal sense—speechlessness; after that, until the age of seven, a child is *infantiæ proximus*; and from the eighth year to puberty he is *pubertati proximus*. An infant in the last stage could, with the assent of his tutor, act so as to bind himself by stipulations; in the earlier stages he could not, although binding stipulations could be made to him in the second stage. After puberty, until the age of twenty-five years, a modified infancy was recognized, during which the minor's acts were not void altogether, but voidable, and a curator was appointed to manage his affairs. The difference between the tutor and the curator in Roman law was marked by the saying that the former was appointed for the care of the person, the latter for the estate of the pupil. These principles of course apply only to children who are *sui juris*. The *patria potestas*, so long as it lasts, gives to the father the complete control of the son's actions; and tutorship and curatorship were devices for protecting those who were free from the *potestas*, but unable by reason of infancy to control their own affairs. The right of the father to appoint tutors to his children by will was recognized by the Twelve Tables, as was also the tutorship of the *agnati* (or legal as distinct from natural relations) in default of such an appointment. Tutors who held office in virtue of a general law were called *legitimi*. Besides and in default of these, tutors *dativi* were appointed by the magistrates. These terms are still used in much the same sense in modern systems founded on the Roman law, as may be seen in the case of Scotland, noticed below.

By the law of the United States full age is twenty-one, and all minors alike are subject to incapacities. The period of twenty-one years is regarded as complete at the beginning of the day before the birthday: for example, an infant born on the first day of January attains his majority at the first moment of December 31st. The incapacity of an infant is designed of course for his own protection, and its general effect is to prevent him from binding himself absolutely by obligations. In the matter of contracts the statement has generally passed current that an infant's contracts, except when they are binding for special reasons, are either void or voidable, *i. e.*, null, *ab initio*, or capable of being nullified by the infant at his choice. Contracts, for example, which cannot be beneficial to the infant are said to be absolutely void. A bond with a penalty is for this reason declared to be void. On the other hand, it is alleged by the more recent text-writers that the words void and voidable have not been carefully distinguished, and that a contract is often described as void when it is only meant that it is not binding. On this theory all the contracts of an infant might be described as voidable at his option except those few which are absolutely valid. On his voidable contract an infant may sue if he chooses to do so, but may not be sued. Of the contracts of an infant which are binding *ab initio*, the most important are those relating to "necessaries." The word is used in an extended signification to cover "articles fit to maintain the person in the particular state, degree, and station in life in which he is." Whether a particular thing is necessary or not is a question of fact to be decided by a jury, but it is for the judge to say whether it is *prima facie* of a description such that it may be a necessary.

At common law a bargain made by an infant might be ratified by him after full age, and would then become in all respects binding. It has been held in a recent case that this action applies to promises of marriage, so that where an infant had promised marriage, and after attaining full age had continued to recognize the promise, no action arose on the breach. But an actual contract of marriage may be lawfully made by persons under age. So, generally, an infant may bind himself by contract of apprenticeship or service. Infancy is in general a disqualification for public offices and professions, *e. g.*, to be a member of congress or an elector, a mayor or alderman, a priest or deacon, a barrister or solicitor, etc.

The custody of an infant belongs, in the first place, and against all other persons, to the father, who is said to be "the guardian of his children by nature and nurture," and the father may by deed or will dispose of the custody or tuition of his children until the age of twenty-one. If the father is dead, and has appointed no testamentary guardian, the mother is recognized as "guardian by nature and nurture."

INFANTICIDE. The history of infanticide as an archaic institution has already been referred to in the article FOUNDLING HOSPITALS. Children of each sex were sacrificed as religious offerings. Indeed, in some cases, *e. g.*, in expiations for sacrilege, the boy, as being the nobler child, was preferred. But what may be called the normal infanticide of early society was probably confined to girls. The custom is in certain places and for certain periods explained by the system of exogamy; but much more generally, as in China at the present day, it is simply an illustration of what Malthus would call a "positive check," the reckless propagation of children far outrunning the means of subsistence which the energy of the parents can provide. Infanticide still survives among many savage races; and where the necessity for strong warriors is felt, a selection is sometimes made of the weaker children for destruction. But this political element seldom enters into the custom. It is because girls cannot provide for themselves that they are killed.

More complex were the leading forms of infanticide in India, now suppressed by the wise action of the British government. The practice, though forbidden by both the Vedas and the Koran, prevailed among the Rájputs and certain of the aboriginal tribes. Among the aristocratic Rájputs, for example, it was thought dishonorable that a girl should remain unmarried. Moreover, a girl may not marry below her caste; she ought to marry her superior, or at least her equal. This reasoning was obviously most powerful with the highest castes, in which, accordingly, the disproportion of the sexes was painfully apparent. But, assuming marriage to be possible, it is ruinously expensive to the bride's father. He has to make gifts of money, clothes, jewels, and sweetmeats to the bridegroom's relatives; and when the marriage ceremony comes, he has, chiefly owing to the exactions of the Bráhmans and Bhats or minstrels, to face a lavish expenditure on feasts which in the case of some rájáhs has been known to reach more than £100,000. To avoid all this, the Rájput killed a certain proportion of his daughters—sometimes in a very singular way. A pill of tobacco and bhang might be given to the newborn child to swallow; or it was drowned in milk; or the mother's breast was smeared with opium or the juice of the poisonous *Datura*. A common form was to cover the child's mouth with a plaster of cow-dung before it drew breath. Infanticide was also practiced to a small extent by some sects of the aboriginal Kandhs, and by the poorer hill tribes of the Himalayas. Where infanticide occurs in India, though it really rests on the economic facts stated, there is usually some poetical tradition of its origin. The measures against the practice were begun toward the end of the 18th century by Jonathan Duncan and Major Walker. They were continued by a series of able and earnest officers during the present century. One of its chief events, representing many minor events, was the Umritsur durbar of 1853, which was arranged by the late Lord Lawrence. At that great meeting the chiefs residing in the Punjab and the trans-Sutlej states signed an agreement engaging to expel from caste everyone who committed infanticide, to adopt fixed and moderate rates of marriage expenses, and to exclude from these ceremonies the minstrels and beggars who had so greatly swollen the expense. According to the present law, if the female children fall below a certain percentage in any tract or among any tribe in northern India where infanticide formerly prevailed, the suspected village is placed under police supervision, the cost being charged to the locality. By these measures, together with a strictly enforced system of reporting births and deaths, infanticide has been almost trampled out; although some of the Rájput clans keep their female offspring suspiciously close to the lowest average which secures them from surveillance.

The modern crime of infanticide shows no symptom of diminution in the leading nations of Europe. In all of them it is closely connected with illegitimacy in the class of farm and domestic servants. The crime is generally committed by the mother for the purpose of completing the concealment of her shame, and in other cases, where shame has not survived, in order to escape the burden of her child's support. The paramour sometimes aids in the crime, which is not confined to unmarried mothers. The ease with which affiliation orders are obtained in Great Britain must save the lives of many children. In France, where the inquiry into paternity is forbidden, a controversy still goes on as to the influence of hospitals for "assisted children," which are said to save life at the expense of morality. It seems certain that the great administrative change involved in closing the "tour" at these hospitals has not perceptibly affected infanticide in France. The laws of the European states differ widely on this subject—some of them treating infanticide as a special crime, others regarding it merely as a case of murder of unusually difficult proof.

It is a statutory offense to administer poison or any noxious thing to a woman with child with intent to procure her miscarriage, or to use any instrument for the same purpose. The law has not yet succeeded in putting down the degraded and wicked trade in abortion. There can be no doubt from the French and American treatises of Gallard and Storer that the crime prevails extensively, and even in classes of society in which infanticide proper would not be thought of without a shudder.

INFANTRY, AMERICAN. The military strength of the United States has of recent years been the subject of much interest. Based on actual enrollments during the late war the estimates give us a total war strength far exceeding the numbers of available forces of any other nation on earth. The standing army is insignificant, as far as regards numbers, and is more designed as a nucleus around which to group such vast bodies of men as surprised the world during the period above referred to. The army, while embracing in its organization the three branches of infantry, artillery, and cavalry, is for the most part composed of infantry, and this branch of the service is the one most and best nurtured in the various national guards of the different states. A short account, therefore, of the organization, *personnel*, and equipment of our infantry will not be devoid of interest. The tactical unit of our army is the company. On a war basis the company consists of 100 men. On a peace footing the company generally consists of fifty private soldiers, captain, two lieutenants, five sergeants, four corporals, two musicians, two artificers, one wagoner. The president of the United States may on special occasion increase the number of men in a company up to 100. The army of the United States consists entirely of volunteers, enlisted at various points of the country by recruiting officers detailed specially for that duty. These recruits must be able-bodied men not older than thirty-five years nor younger than sixteen, at the time of initial enlistment. Once enlisted a man can continue his connection with the army till he can no longer perform military duty.

The term of enlistment is generally for five years. When the company is full it is generally divided into two bodies called platoons, each platoon being under the command of a lieutenant. The men are generally arranged according to height, with a corporal at either end of the platoons. There are two ranks of men, one behind the other, this arrangement being styled "double rank" formation. The companies in the standing army, usually being small, are not generally formed on the platoon basis, but generally in only one rank, this being called the "single rank" formation. The company marches either in line or in column of fours. The men in the line, after being drawn up, begin at the right and count off successively in sets of fours, these sets becoming the unit of company maneuvers, and marching abreast in column formation. Ten companies compose a regiment, which is commanded by a colonel. The other members of a regimental organization are a lieutenant-colonel, a major, an adjutant, a quartermaster, a sergeant-major, a quartermaster-sergeant and three musicians. In the negro regiments a chaplain is added to the regimental officers and ranks as a captain, but cannot take command of troops. All officers above the grade of sergeant (including chaplains) are commissioned officers, and receive their commissions from the President, with the consent of the Senate. The sergeants and all inferior officers are non-commissioned and are appointed by the regimental commander, who gives them his "warrant" of authority, which must be countersigned by the adjutant. The non-commissioned company officers are generally appointed on recommendation of the company commanders. The first sergeant is selected by his captain from among the sergeants so appointed, and he may be degraded from first to duty sergeant by the captain without reference to any other authority. Any portion of a regiment (greater than two companies) arranged for tactical maneuver is called a battalion. Two companies form a division. The general formation of a battalion is in line, the men being in double rank. The field and staff officers are mounted and the adjutant is on foot. The senior officer present takes command. There is generally but one battalion in an American regiment, differing thus from European armies, the regiments in the latter being generally divided into three battalions. A movement is now on foot to increase the strength of the regiments and the number of battalions to each. Under this arrangement the peace footing of a regiment will be 600, and its war strength double this number. The color guard of a regiment consists of a color sergeant and seven corporals, and is posted as the left fours in the two ranks of the right center company. The color-sergeant carries the national colors while the regimental colors (when present) are carried by a sergeant (to the left of the color-sergeant) who takes the place of one of the seven corporals mentioned above. The next unit of division above the regiment is the brigade, which is generally composed of four regiments or battalions. There are other tactical bodies, but all above the brigade contain other arms of the service, artillery and cavalry, and hence do not fall within the scope of our present article. Following we give the arms, equipment and pay of the infantry soldier in the regular army:

PAY OF INFANTRY SOLDIER, UNITED STATES ARMY, PER MONTH.

	First enlistment.					First re-enlistment.				
Year in each enlistment	1	2	3	4	5	1	2	3	4	5
Year of total continuous service	1	2	3	4	5	6	7	8	9	10
Amount retained per month till expiration of service	oo	oo	$1	$2	$3	$1	$1	$1	$1	$1
	$	$	$	$	$	$	$	$	$	$
Private or musician	13	13	14	15	16	18	18	18	18	18
Wagoner	14	14	14	14	14	14	14	14	14	14
Artificer	15	15	15	15	15	15	15	15	15	15
Corporal	15	15	16	17	18	20	20	20	20	20
Sergeant	17	17	18	19	20	22	22	22	22	22
First sergeant	22	22	23	24	25	27	27	27	27	27
Principal mus'n (reg't)	22	22	23	24	25	27	27	27	27	27
Chief musician "	60	60	60	60	60	60	60	60	60	60
Sergeant-major "	23	23	24	25	26	28	28	28	28	28
Quartermas. serg't "	23	23	24	25	26	28	28	28	28	28

For subsequent re-enlistments, $1 per month more.

In case of re-enlistment *not continuous with original enlist-*

ment, the pay is $16 for private or musician; for higher grades the standard increase as in other cases.

The *retained* pay is given to the soldier, in lump, at the expiration of his five years' enlistment.

Soldiers retired for age are allowed three-fourths of the pay of the grade they held when retired, together with commutation of clothing and rations.

Equipment of infantry soldier, United States army, for field service, in addition to the clothing worn: One rifle and bayonet; one cartridge belt; fifty cartridges; one bayonet scabbard; one canteen; one haversack; one clothing bag containing one shirt, one drawers, one blanket, one hold-all (soap, etc.); one yoke for clothing bag; one overcoat; one piece of shelter tent. Total weight, thirty-four pounds thirteen ounces.

INFINITESIMAL CALCULUS. The mathematical and physical sciences owe their present development to the introduction of infinitesimal calculus. The power, for example, of that calculus as an instrument of analysis has vastly extended the science of geometry, so that the investigations of the ancient Greeks go but a short way into the field of knowledge which has been laid open by the modern method; the discoveries of Archimedes and Appolonius are now easy deductions from its more extended results.

So long as the early geometers confined their speculations to the comparison of the areas of rectilinear figures they encountered little difficulty. They readily showed that the determination of the area of any such figure can be reduced to that of a rectangle, or of a square, and thus be completely effected. This process of finding areas was named the "method of quadratures." It failed, however, when they attempted to determine the areas bounded by curved lines, or the surface of the elementary solids such as the right cone and the sphere. In treating of these the ancients found it necessary to introduce new notions and modes of demonstration into geometry, and the difficulty of comparing the areas of curvilinear with those of the rectilinear figures gave rise to the "method of exhaustions." The fundamental principle of this method consists in conceiving the continual approach of two varying magnitudes to a fixed intermediate magnitude, with which they never become identical, though they may approach it to within less than any assignable difference. For example, a polygon may be inscribed in a circle, and another circumscribed to it, each differing from it by less than any assignable area; hence the ancients may have concluded that areas of circles have to each other the same ratio as the similar polygons inscribed in or circumscribed to them—that is, the ratio of the squares of the radii. But, as this kind of proof was of a different nature from that by which the more elementary doctrines were established, the Greek geometers fortified it by a *reductio ad absurdum* – proving, in the above example, that the square of the radius of one circle is to that of another as the area of the former is to a space which is neither less nor greater than the latter, and therefore exactly equal to it.

During nearly two thousand years no new method enabled mathematicians to rise to a higher generality than that attained in the works of the great Greek geometers. The celebrated Kepler was the first to extend the results of Archimedes. In his treatise entitled *Nova Stereometria Doliorum* (1615), he discussed a number of solids of revolution—for example, those formed by the revolution of a conic section about any ordinate, or a tangent at the vertex, or any line within or without the curve. Thus he considered some ninety new solids, and proposed problems concerning them; of these problems he resolved only a few of the most simple. In this treatise he introduced for the first time the name and notion of "infinity" into the language of geometry. Thus, he considered a circle as composed of an "infinite" number of triangles, having their common vertex at the center, and forming the circumference by their bases. In like manner he regarded a cone as composed of an infinite number of pyramids, having their vertices at its vertex, and standing on an infinite number of triangular bases, bounded by the circular base of the cone. It may also be noted that Kepler was the first to observe that the increment of a variable—the ordinate of a curve, for example—is evanescent for values infinitely near a maximum or minimum value of the variable. This remark contains the germ of the rule for determining "maxima" and "minima," given by Fermat about twenty years subsequently.

Several years after Kepler had given his method of determining volumes of revolution, another celebrated theory, of similar kind—the "geometry of indivisibles" (1635) of Cavalieri, professor of geometry at Bologna—marks an epoch in the progress which science has made in modern times. In this work lines were considered as composed of an infinite number of points, surfaces of lines, and solids of surfaces. For example, if the perpendicular of a triangle be divided into an infinite number of equal parts, and through each point of division a line be drawn parallel to the base and terminated by the sides, then, according to Cavalieri, we may consider the area of the triangle as the sum of all these parallel lines, regarded as its elements. Again, as these parallels form a series in arithmetical progression, of which the first term is zero, this sum is represented by half the product of the last term and the number of terms. Now the base is the last term, and the altitude measures the number of terms; thus he deduced the ordinary expression for the area of a triangle. Cavalieri applied his method to a number of problems, such as finding the volumes of pyramids, the areas of certain simple curves of the parabolic species, the determination of centers of gravity, etc.; and it is remarkable that he was the first who gave an accurate demonstration of the well-known properties of the center of gravity, originally announced by Pappus, but commonly called Guldin's theorems. It is accordingly to Cavalieri, and not to Guldin, that the credit is due of having made the first advance beyond Pappus. Cavalieri's method is analogous to that employed in the integral calculus, the "indivisible" being that which has since been styled the "differential element" of the integral.

The method of Cavalieri was severely criticised by some of his contemporaries, more especially by Guldin. They alleged that, since a line has no breadth, no number of right lines, however great, when taken together, could make up a plane area. This objection was answered by Cavalieri; but the reply was stated in the clearest form by Pascal, who observed (letter to M. de Carcavi, 1658) that the method of indivisibles possessed all the rigor of that of exhaustions, from which it differed only in the manner of expression, and that, when we conceive an area as a sum of a system of parallel ordinates, we mean in reality an indefinite number of rectangles under the several ordinates, and the small equal portions into which we conceive the common perpendicular to these ordinates to be divided. This passage is remarkable—as was well observed by Carnot—as it shows that the notion of mathematical infinity, as now employed, was not strange to the geometers of that time; for it is clear that Pascal employed the word "indefinite" in the same signification as we now attach to the word "infinite," and that he called "small" that which is now called "infinitely small," also that he neglected these small quantities in comparison with finite quantities—thus he regarded as simple rectangles the small portions of the area of the curve comprised between two consecutive ordinates, neglecting the small triangles which have for their bases the differences of these ordinates. Carnot adds that no person attempted to reproach Pascal with want of rigor in his demonstrations.

Pascal applied the method of Cavalieri with eminent success to the investigation of properties of the cycloid, and other problems. His researches, according to D'Alembert, closely approach to the integral calculus, and form the connection between the methods of Archimedes and of Newton.

The most important application, however, of Cavalieri's method was that of Wallis, Savilian professor at Oxford, who, in 1655, gave an admirable specimen of this method in his *Arithmetica Infinitorum, sive nova Methodus inquirendi in Curvilinearum Quadraturam.* Pursuing Cavalieri's views, he reduced the problem of finding the areas of a large number of curves, and the volumes of solids of revolution, to the summation of the powers of the terms of arithmetical series, consisting of an infinite number of terms—or rather to the determination of the ratio of the arithmetical mean of all such powers of the terms to the like power of the last term.

For example, in the series of square numbers 0, 1, 4, 9, 16, etc., the ratio of the mean to the last is, for the first three terms, $\frac{0+1+4}{4+4+4} = \frac{1}{3}+\frac{1}{12}$; for the first four, $\frac{0+1+4+9}{9+9+9+9} = \frac{1}{3}+\frac{1}{18}$; for the first five, $\frac{0+1+4+9+16}{16+16+16+16+16} = \frac{1}{3}+\frac{1}{24}$; in like manner the next fraction is $\frac{1}{3}+\frac{1}{30}$. Hence, Wallis noticed that the fractions approach nearer and nearer to $\frac{1}{3}$; and, as the denominators in the fractions $\frac{1}{12}$, $\frac{1}{18}$, $\frac{1}{24}$, $\frac{1}{30}$ form an arithmetical series, with a common difference 6, it follows that, when the number of terms is indefinitely increased, the resulting fraction becomes ultimately $\frac{1}{3}$.

Wallis applied the same method to the series 0, 1^3, 2^3, 3^3, etc., and found without difficulty that the aforesaid ratio is $\frac{1}{4}$ in this case; and so generally. He also introduced into analysis the notation of fractional indices instead of radicals, and extended his method of summation to series, proceeding by fractional powers of the natural numbers 1, 2, 3, etc. Wallis was enabled by these principles to obtain the areas of many curves, and the volumes of solids which had not been previously found.

Again, in his treatise *De Curv. rectif.* (1659), Wallis showed that certain curves were capable of being "rectified," or that straight lines might be found to which they were exactly equal, a remark which was very soon verified by a young English mathematician, William Neil, who, by Wallis' method, obtained, in 1660, the length of any arc of a semicubical parabola. This is the first curve that was rectified. The cycloid is the second; its rectification was effected by Sir C. Wren (*Phil. Trans.*, 1673). The methods we have thus far considered were more especially precursory to the integral calculus, having mainly reference to the quadrature of curves and cubature of solids. We now propose to consider the question of tangents to curves, in which the differential calculus may be said to have originated.

The great discovery of Descartes in his application of algebra to geometry (1637) imparted to the latter science the character of abstraction and generality which distinguishes modern from ancient geometry. By it the study of curves was brought under the domain of analysis, and instead of investigation being restricted to particular properties of a few isolated curves, as it had been hitherto, general views and methods applicable to all curves were introduced.

Hence the general problem of drawing tangents to curved lines started immediately into prominence. It was found necessary to depart from the definition of tangents given by the ancient geometers, and to consider them in other points of view. A tangent, accordingly, came to be regarded either (1) as a secant of which the points of intersection became coincident; or (2) as the prolongation of the element of the curve, regarded as a polygon of an infinite number of sides; or (3) as the direction of the resultant motion by which the curve may be described. The first view was that of Descartes and Fermat; the second was introduced by Barrow, who thus simplified the method of Fermat; and the third was that of Roberval.

Descartes' method of drawing a tangent consisted in supposing a circle (whose center he placed on the axis of x) to cut the curve in two points; then, if the radius of the circle be supposed to decrease, *its center remaining fixed*, so that the points of section approach nearer and nearer and finally coincide, the circle will touch the curve; thus, by aid of the equation of the curve, the problem was reduced to one of finding the condition of equal roots in an equation. This method is remarkable as being the first general process of applying analysis to the problem of tangents; at the same time it is only capable of practical application in a small number of simple cases.

Many years subsequently (*Act. Erud. Lips.*, 1691) John Bernoulli extended Descartes' method with success to the problem of finding the center of curvature and the equation of the evolute of an algebraic curve. In his application he supposed the center of a circle taken on the normal to a curve, and *the center to vary* until *three* of the points of intersection of the circle with the curve became coincident, *i.e.*, so that the resulting equation should have three equal roots. Thus, for example, he showed, without difficulty, that the evolute of a parabola was a semicubical parabola. He also remarked that, when four roots coincide, the center of curvature becomes a cusp on the evolute.

It should also be noticed that we owe to Descartes the general method of drawing a tangent to a roulette.

Again, Descartes first introduced the method of indeterminate coëfficients into analysis—a principle, as was ably shown by Carnot, which is of itself sufficient to establish by ordinary algebra the fundamental principles of the infinitesimal calculus.

The method of Fermat for drawing tangents was based on his method of maxima and minima. This latter was founded, as already observed, on a principle of Kepler's, viz., that, whenever a magnitude attains a maximum or minimum, its increment, or diminution, for a very small change in the variable on which it depends, becomes evanescent.

Accordingly, to determine the maximum or minimum of any function of x, Fermat substituted $x + e$ instead of x, and equated the two consecutive values of the function; then, removing the common terms, and dividing by e, he made $e = 0$, and obtained an equation for determining the maximum or minimum value.

Thus adopting the modern notation, let $y = f(x)$, and $y_1 = f(x+e)$, then $f(x+e) - f(x) = 0$. Dividing by e,

$$\frac{f(x+e) - f(x)}{e} = 0;$$

hence $f'(x) = 0$.

Thus the roots of the derived equation, $f'(x) = 0$, correspond to the maximum or minimum values of $f(x)$. Consequently we see that Fermat's rule agrees with that of the differential calculus, and in fact is the method of the calculus as applied to such cases.

In consequence of Fermat's both having introduced the conception of an infinitely small difference, and also having arrived at the principle of the calculus for determining maxima and minima, it was maintained by Laplace, Lagrange, Fourier, and other eminent French mathematicians that Fermat ought to be regarded as the first inventor of the differential calculus. In reply to this, we need but introduce the remark of their distinguished countryman Poisson, "that this calculus consists in a system of rules proper for finding the differentials of all functions, rather than in the use which may be made of these infinitely small variations in the solution of one or two isolated problems."

Fermat seems to have given no general demonstration of his method, but contented himself with giving particular applications of it to some problems of maxima and minima, as well as to finding the tangents to and the centers of gravity of a few curves.

Barrow, Newton's predecessor in the Lucasian chair of mathematics at Cambridge, simplified and extended the method of Fermat, and advanced a step further in the development of the infinitesimal method, by the introduction of two infinitesimals instead of one in the problem of drawing a tangent. His method was as follows: Let x, y be the coördinates of a point P on a curve (fig. 1), and take Q an adjacent point; let e=PR=MN be the increment of x, and a=QR the increment of y; then, substituting $x+e$ for x, and $y+a$ for y, in the equation of the curve, subtracting the equation of the curve for the original values, and rejecting all terms of the second and higher degrees in a and e, he obtained the limiting value of $a:e$, or of PM : MT, thus determining the value of the subtangent. The triangle PQR, which has for its sides the elements of the curve, of the abscissa, and of the ordinate, has been called Barrow's *differential triangle.*

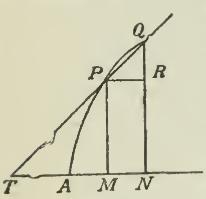


Fig. 1.

The method of tangents of Roberval is based on the conception of the composition of motions, recently introduced by Galileo into mechanics, and depends on finding, from the properties of the curve, the different components of the motion of the point at which the tangent is required. The direction of the resultant of these motions determines that of the tangent. This method bears an analogy to Newton's method of "fluxions," but is very limited in its application on account of the impossibility of applying it except in a few cases. Roberval applied it successfully to the following curves—the parabola, hyperbola, ellipse, conchoid of Nicomedes, limacon of Pascal, spiral of Archimedes, quadratrix, cissoid, cycloid, companion to the cycloid, and the parabola of Descartes.

We thus see that both in England and on the continent the principles of the infinitesimal calculus were being gradually developed. Their importance was seen and understood, and they were employed in extending the dominion of geometry. Nothing more was required but an appropriate notation to form them into a system. This was accomplished by Newton and Leibnitz, who appeared nearly at the same time in the field of discovery. In ascribing to each of these great men the full honor due to the merit of the invention of the calculus, it is proper to add that this is a question which at one time divided the opinions of the scientific world, and gave rise to a controversy which was agitated with great keenness for almost a whole century. There never could be any doubt as to Newton being the inventor of the calculus of fluxions; but the question strongly contested has been, whether Leibnitz invented his calculus independently, or borrowed it from the fluxional calculus, with which at bottom it is identical. We next proceed to give a brief account of the notation and principles of the method of fluxions, as that which was first discovered.

The idea of a fluxion, as its name indicates, originated from that of motion, and all geometrical magnitudes were considered by Newton as capable of generation by continuous motion. Thus lines are conceived as generated by the motion of points, surfaces by that of lines, solids by surfaces, etc. Again, if we conceive a moving point as describing a curve, and the curve referred to coördinate axes, then the velocity of the moving point can be decomposed into two others, one parallel to the axis of x, the other to that of y; these velocities are called the "fluxions" of x and y respectively, and the velocity of the point is the fluxion of the arc. Reciprocally, the arc is called the "fluent" of the velocity with which it is described; and the ordinates x and y are the fluents of their velocities respectively. Again, if the velocity of the moving point be regarded as constant, the fluxions of the abscissa and ordinate of any point on the curve (except in the case of a right line) will be variable; and their ratio at each instant will depend on the nature of the curve, *i.e.*, on the relation between the coördinates. Reciprocally, the relation between the coördinates depends necessarily on that which exists at each instant between their fluxions. Hence we may seek to determine the relation between the fluxions, when we know that which exists between the coördinates, *i.e.*, the equation of the curve; and reciprocally we may seek to discover the relation between the coördinates when we know that between their fluxions, either alone or combined with the coördinates themselves. The first part of the problem is called the "method of fluxions," and the second the "inverse method of fluxions."

Again, in the same case, not only do the coördinates x and y change, but also the subtangent normal, radius of curvature, etc.; that is to say, each of these quantities increases or decreases more or less rapidly, as well as the coördinates themselves. All these quantities, accordingly, have fluxions, whose ratios are also determined by the motion of the point. Consequently these quantities may in like manner be regarded as "fluents." Similar remarks apply to areas and surfaces regarded as fluents. Newton observes that he does not consider the time formally (*formaliter*), but supposes that one of the proposed quantities increases equably (*æquabili fluxu*), to which the others are referred (*tanquam ad tempus*). This fluent may be chosen at pleasure, and is what we now are accustomed to call the independent variable.

Again, if any quantities, regarded as fluents, be represented by letters, such as u, x, y, z, etc., the corresponding fluxions are represented by u, x, y, z, etc., respectively. Next, if u, x, y, z be regarded as variable or fluent quantities, their fluxions are represented by u, x, y, z, and are the fluxions of the fluxions of u, x, y, etc., *i.e.*, the second fluxions. If one of these, x for instance, be taken as the "principal fluxion," then x is a constant, and consequently x=0. In like manner we may have third fluxions, as well as those of higher orders.

Again, u, x, y, etc., may be regarded as themselves the fluxions of other quantities called their fluents. These quantities were represented by Newton, sometimes by u, x, y, etc., in other places by [u], [x], etc.; and from them it may be desired to proceed to the fluents.

The infinitesimal calculus had in the outset its opponents, such as the Abbé de Catelan, a zealous Cartesian, who declared in his *Logistique Universelle, et Méthode pour les Tangentes* (1694), that it would be better to extend the principles of the Cartesian geometry than to seek for new methods; and this was said in the preface of a book composed on the principles, somewhat disguised, of the very calculus of which he was an opponent. It had another adversary in Nieuwentijt, a man who had written some tolerable works on morality and religion, but who had slight pretensions to be regarded as a geometer. Catelan was satisfactorily answered by De l'Hôpital, as was Nieuwentijt by Leibnitz, and afterward by Bernoulli and Hermann, who proved that this adversary of the calculus really did not know what he opposed. For instance, Nieuwentijt, while admitting differentials of the first order, rejected all those of higher orders. For such a difference of treatment there is no foundation, for, if we imagine in a circle an infinitely small chord of the first order, the versine is an infinitely small line of the second order.

The calculus had a more formidable enemy in Rolle, a skillful algebraist, but a man full of confidence in his own notions, rash in forming his opinions, and jealous of the inventions of others.

Mathematicians have differed as to the best way of expounding the principles of the calculus. Newton employed the theory of motion as the means of connecting its doctrines with the principles of ordinary analysis. Leibnitz, again, with the same view, conceived quantity as passing from one degree of magnitude to another by the continual addition of infinitely small parts. The mind finds no great difficulty in distinctly apprehending the subject in either way. Objections have, however, been taken to both, and attempts made to substitute a better. Euler considered the infinitely small quantities of Leibnitz as absolutely zeros, that have to each other ratios derived from those of the vanishing quantities which they replace. D'Alembert proposed to make the basis of the calculus the consideration of the ratios of the limits of quantities. This method, as was indeed stated by D'Alembert, does not differ in any material respect from Newton's prime and ultimate ratios. An English mathematician, Landen, substituted for the Newtonian method of fluxions another purely algebraical. His views are contained in a work entitled *The Residual Analysis, a new branch of the Algebraic Art* (1764). Lagrange, too, in the *Memoirs of the Berlin Academy* for 1772, proposed to base the calculus altogether on the expansion of functions, and thus to establish it on algebraical principles merely. He subsequently developed his method in his *Théorie des Fonctions Analytiques* (1797), and in his *Leçons sur le Calcul des Fonctions* (1806). Lagrange, however, adopted the infinitesimal method as the basis of his most important work, viz., the *Mécanique Analytique.* He states in his preface to its second edition (1811) that "when we have properly conceived the spirit of the infinitesimal method, and are convinced of the exactness of its results by the geometrical method of prime and ultimate ratios, or by the analytical method of derived functions, we may employ infinitely small quantities as a sure and valuable means of abridging and simplifying our demonstrations."

INFLUENZA (generally known as La Grippe) is a term applied to an infectious febrile disorder of short duration, characterized specially by catarrh of the respiratory passages and alimentary canal, and occurring mostly as an epidemic.

The symptoms of this disease develop suddenly, with all the phenomena attending a severe cold or catarrh. At first there are chills or rigors, which are soon accompanied with distressing headache and tightness across the forehead, tenderness and watering of the eyes, and sneezing and discharge from the nostrils. To these succeed heat and soreness of the throat, hoarseness, cough, and, it may be, some difficulty of breathing. The temperature is elevated, the pulse quick and feeble, and the skin, which at first was dry, becomes moist, and is said to exhale a peculiar musty odor. The digestive system participates in the disturbance, and there is loss of appetite, with thirst, vomiting, and occasionally diarrhœa.

Rapid loss of strength and remarkable depression of spirits accompany these various symptoms, and are among the most characteristic features of the disease. After lasting for two or three days, the symptoms abate and convalescence begins, but there may remain, particularly in severe cases, and in persons at the extremes of life, great debility for a length of time, or the attack may be complicated with inflammatory affections of the chest, which may prove a source of danger far exceeding that of the original disease. Apart from this, influenza is not usually a very fatal malady, although some epidemics such as those of 1762 and 1889 have been characterized by a severe type of the disease and considerable loss of life. The mortality is generally reckoned at about 2 per cent., but when an extensive epidemic prevails, even this proportion is sufficient to swell the death-rate largely.

This disease is referred to in the works of the ancient physicians, but accurate descriptions of it have been given by numerous medical writers during the last three centuries, in connection with epidemics which have occurred from time to time. These various accounts agree substantially in their narration of the phenomena and course of the disease, and influenza has in all times been regarded as fulfilling all the conditions of an epidemic in its sudden invasion, rapid and extensive spread, and speedy and complete disappearance. Among the chief epidemics of influenza are those of 1762, 1782, 1787, 1803, 1833, 1837, 1847, and 1889. In several of these the disease appeared to originate in some parts of Asia, and to travel westward through Europe and on to America, resembling in this respect certain cholera epidemics, although the two classes of disease have nothing in common. In some of the epidemics influenza has spread through the whole of Europe in the course of six weeks. Wherever it appears the whole community suffers to a greater or less extent, irrespective of age or condition of life. It has occasionally appeared in fleets at sea away from all communication with land, and to such an extent as to disable them temporarily for service. This happened in 1782 in the case of the squadron of Admiral Kempenfelt, which had to return to England from the coast of France in consequence of a severe epidemic of influenza attacking his crews, while at the same time the squadron of Lord Anson, off the coast of Holland, suffered extensively from a similar outbreak. Many instances of a like kind have been recorded.

Much speculation and some amount of scientific inquiry have been expended in endeavors to ascertain the cause of this remarkable ailment. The Italians in the seventeenth century ascribed it to the influence of the stars, and hence the name "influenza," by which the disease has subsequently been known. By some it has been held to depend on certain telluric, and by others on certain climatic conditions; but the occurrence of the disease in all sorts of climates and localities is sufficient to negative these theories. The view which refers it to some morbific principle present in the atmosphere during an epidemic is that which has gained widest acceptance, but the nature of this infecting agent is unknown. Various hypotheses have been advanced on the subject, such as some change in the electrical condition of the air, or the over-abundance of ozone, but these have not been confirmed by observation. More probable, and more in harmony with observed facts, is the theory that in influenza, as in other epidemic diseases, there is present in the atmosphere some minute organism of specific nature, which is not only distributed over wide areas, but which when introduced into the bodies of those attacked multiplies there indefinitely, and becomes a source of infection by the breath, etc., and in this way a further cause of the spread of the disease. The contagiousness of influenza appears to be unquestionable. The treatment of this disorder is at present very diverse in principle and practice. That yielding best results during the last epidemic seemed to be exhibited in those cases in which special attention was directed to allaying tendency to congestion in the earlier stages of the disease, accompanied by a free administration of alkaline and anodyne remedies such as salycillate of sodium, codeine, etc., and in the latter stages of the disease the employment of tonics and antiperiodics, such as arsenious acid, iron, quinine, etc. Due attention should be paid to the catarrhal and (when present) digestive disturbances. The constitutional treatment as above suggested must be supplemented by judicious applications of local treatment to induce warmth, perspiration, etc., but care must be taken not to encroach on the strength of the patient, and if possible the occurrence of complications such as pneumonia, bronchitis, etc., avoided.

INFORMATION, in law, is a formal accusation of a crime committed, preferred *ex officio* by the commonwealth's attorney or other law officer without the intervention of a grand jury. It lies only for misdemeanor and not for treason, felonies, or misprision of treason; and it is properly employed against such "enormous misdemeanors" as peculiarly tend to disturb or endanger the government, *e.g.*, seditions, obstructing officers in the execution of their duties, etc. The information is filed without the leave of the court. An information may also be filed at the instance of a private prosecutor for misdemeanors not affecting the government, but being peculiarly flagrant and pernicious. Thus criminal informations have been granted for bribing or attempting to bribe public functionaries, and for aggravated libels on public or private persons. Leave to file an information is obtained after an application to show cause, founded on a sworn statement of the material facts of the case.

INFUSORIA. See PROTOZOA.

INGELHEIM. Oberingelheim and Niederingelheim, two contiguous market-towns of Germany, in the Hessian province of Rhine Hesse, circle of Bingen, are situated on the Hessian Ludwig Railway and on the Salz near its confluence with the Rhine, nine miles west-northwest of Mainz.

INGEMANN, BERNHARD SEVERIN (1789–1862), a Danish poet and novelist, was born at Torkildstrup, in the island of Falster.

INGERSOLL, a town of Oxford county, Ontario, Canada, with a population (1901) of 4,573. It has banks, newspaper offices, foundries, machinery, woolen and wooden-ware factories and good railroad and telegraph facilities.

INGOLSTADT, a fortified town in the government district of Upper Bavaria, is situated on the left bank of the Danube at its junction with the Schutter, fifty miles north of Munich by rail. As the chief town of the district it is the seat of the usual authorities. The town is well built. The principal buildings are the old castle of the dukes of Bavaria-Ingolstadt, now used as an arsenal; the remains of the earliest Jesuits' college in Germany, founded in 1555; the former university buildings, now a school; the theater; the large Gothic church of Our Lady, founded in 1425, with two massive towers, and the grave of Doctor Eck, Luther's opponent; the Franciscan convent and nunnery; and several other churches and hospitals. Population (1901), 22,206.

INGRES, JEAN AUGUSTE DOMINIQUE, whose name represents one of the most important among the conflicting tendencies of modern art, was born at Montauban, France, August 29, 1780. At Toulouse, to which place his father had removed from Montauban in 1792, Ingres received lessons from Joseph Roques, a painter. whom he quitted at the end of a few months to become a pupil of M. Vigan, professor at the academy of fine arts in the same town. From M. Vigan, Ingres, whose vocation became day by day more distinctly evident, passed to M. Briant, a landscape-painter, who insisted that his pupil was specially gifted by nature to follow the same line as himself. For a while Ingres obeyed, but he had been thoroughly aroused and enlightened as to his own objects and desires by the sight of a copy of Raphael's *Madonna della Sedia*, and having decisively ended his connection with Briant, he started for Paris, where he arrived about the close of 1796. He was then admitted to the studio of David, for whose lofty standard and severe principles he always retained a profound appreciation. David recognized the merit of one who soon ranked among his most promising pupils, and Ingres, after four years of devoted study, in the course of which (1800) he obtained the second place in the yearly competition, finally carried off the Grand Prix (1801). The work thus rewarded—the *Ambassadors of Agamemnon in the Tent of Achilles* (École des Beaux Arts)—was admired by Flaxman so much as to give umbrage to David, and was succeeded in the following year (1802) by the execution of a *Girl after Bathing*, and a woman's portrait; in 1804 Ingres exhibited *Portrait of the First Consul* (Musée de Liége), and portraits of his father and himself; these were followed in 1806 by *Portrait of the Emperor* (Invalides), and portraits of M., Mme., and Mdlle. Rivière (the first two now in the Louvre). All these and various minor works were executed in Paris, for it was not until 1809 that the state of public affairs admitted of the reëstablishment of the Academy of France at Rome, and we find from the journals of the day that they produced a disturbing impression on the public. It was clear that the artist was someone who must be counted with; his talent, the purity of his line, and his power of literal rendering were generally acknowledged; but he was reproached with a desire to be singular and extraordinary.

The year after his arrival in Rome (1808) Ingres produced *Œdipus and the Sphinx*, a work which proved him in the full possession of his mature powers, and began the *Venus Anadyomene*, completed forty years later, and exhibited in 1855. These works were followed by some of his best portraits, that of M. Bochet (Louvre), and that of Mme. la Comtesse de Tournon, mother of the prefect of the department of the Tiber; in 1811 he finished *Jupiter and Thetis*, an immense canvas now in the Musée of Aix; in 1812 *Romulus and Acron*, and *Virgil reading the Æneid*—a composition very different from the version of it which has become widely popular through the engraving executed by Pradier in 1832. The original work, executed for a bedchamber in the Villa Aldobrandini-Miollis, contained neither the figures of Mæcenas and Agrippa nor the statue of Marcellus; and Ingres, who had obtained possession of it during his second stay in Rome, intended to complete it with the additions made for engraving. But he never got beyond the stage of preparation, and the picture left by him, together with various other studies and sketches, to the Musée of his native town, remains half destroyed by the process meant for its regeneration. The *Virgil* was followed by the *Betrothal of Raphael*, a small painting, now lost, executed for

Queen Caroline of Naples; *Don Pedro of Toledo Kissing the Sword of Henry IV.*, exhibited at the Salon of 1814, together with the *Chapelle Sistine* (Collection Legentil; lithographed by Sudre), and the *Grande Odalisque* (Collection Seillière; lithographed by Sudre). In 1815 Ingres executed *Raphael* and the *Fornarina* (Collection Mme. N. de Rothschild; engraved by Pradier); in 1816 *Aretin and the Envoy of Charles V.* (Collection Schroth), and *Aretin and Tintoret* (Collection Schroth); in 1817 the *Death of Leonardo* (engraved by Richomme) and *Henry IV. Playing with his Children* (engraved by Richomme), both of which works were commissions from M. le Comte de Blacas, then ambassador of France at the Vatican. *Roger and Angelique* (Louvre; lithographed by Sudre), and *Francesca da Rimini* (Musée of Angers; lithographed by Aubry Lecomte), were completed in 1819, and followed in 1820 by *Christ giving the Keys to Peter* (Louvre).

During all these years Ingres' reputation in France did not increase. The interest which his *Chapelle Sistine* had aroused at the Salon of 1814 soon died away; not only was the public indifferent, but among his brother artists Ingres found scant recognition. The strict classicists looked upon him as a renegade, and strangely enough Delacroix and other pupils of Guérin—the very leaders of that romantic movement for which Ingres, throughout his long life, always expressed the deepest abhorrence—alone seem to have been sensible of his merits. The weight of poverty, too, was hard to bear. The good offices of Bartolini, and of one or two persons who felt a friendly interest in the painter, could only alleviate the miseries of this stay in a town where Ingres was all but wholly deprived of the means of at least gaining daily bread by the making of those small portraits for the execution of which, in Rome, his pencil had been constantly in request. Before his departure he had, however, been commissioned to paint for M. de Pastoret the *Entry of Charles V. into Paris*, and M. de Pastoret now obtained an order for Ingres from the Administration of Fine Arts; he was directed to treat the *Vœu de Louis XIII.* for the cathedral of Montauban. This work, which was exhibited at the Salon of 1824, met with universal approbation; even those sworn to observe the unadulterated precepts of David found only admiration for the *Vœu de Louis XIII.* On his return Ingres was received at Montauban with enthusiastic homage, and found himself celebrated throughout France. In the following year (1825) he was elected to the Institute, and his fame was further extended in 1826 by the publication of Sudre's lithograph of the *Grand Odalisque*, which, having been scorned by artists and critics alike in 1819, now became widely popular. A second commission from the government called forth the *Apotheosis of Homer*, which, replaced by a copy in the decoration of the ceiling for which it was designed, now hangs in the galleries of the second story of the Louvre. From this date up till 1834 the studio of Ingres was thronged, as once had been thronged the studio of David, and he was a recognized *chef d'école.* While he taught with despotic authority, and admirable wisdom, he steadily worked; and when in 1834 he produced his great canvas of the *Martyrdom of Saint Symphorien* (cathedral of Autun; lithographed by Trichot-Garneri), it was with angry disgust and resentment that he found his work received with the same doubt and indifference, if not the same hostility, as had met his earlier ventures. The suffrages of his pupils, and of one or two men—like Decamps—of undoubted ability, could not soften the sense of injury. Ingres resolved to work no longer for the public, and gladly availed himself of the opportunity to return to Rome, as director of the École de France, in the room of Horace Vernet. There he executed *La Vierge à l'Hostie* (Imperial collections St. Petersburg), *Stratonice* (Duc d'Aumale), *Portrait of Cherubini* (Louvre), and the *Petite Odalisque* for M. Marcotte, the faithful admirer for whom, in 1814, Ingres had painted the *Chapelle Sistine.*

The *Stratonice*, executed for the duke of Orleans, had been exhibited at the Palais Royal for several days after its arrival in France, and the beauty of the composition produced so favorable an impression that, on his return to Paris in 1841, Ingres found himself received with all the deference that he felt to be his due. A minor work, *Jupiter and Antiope*, marks the year 1851, but Ingres' next considerable undertaking (1853) was the *Apotheosis of Napoleon I.*, painted for the ceiling of a hall in the Hôtel de Ville; *Jeanne d'Arc* (Louvre) appeared in 1854; and in 1855 Ingres consented to rescind the resolution more or less strictly kept since 1834, in favor of the International Exhibition, where a room was wholly reserved for his works. In consequence of the effect which they produced, Prince Napoleon, president of the jury, proposed an exceptional recompense for their author, and obtained from the emperor Ingres' nomination as grand officer of the Legion of Honor. With renewed confidence Ingres now took up and completed one of his most charming productions—*La Source* (Louvre), a figure of which he had painted the torso in 1823, and which seen with other works in London (1862) there renewed the general sentiment of admiration, and procured him, from the imperial government, the dignity of senator. After the completion of *La Source*, the principal works produced by Ingres were, with one or two exceptions, of a religious character; *La Vierge de l'Adoption*, 1858 (painted for Mdlle. Roland-Gosselin), was followed by *La Vierge Couronnée* (painted for Mme. la Baronne de Larinthie) and *La Vierge aux Enfans* (Collection Blanc); in 1859 these were followed by repetitions of *La Vierge à l'Hostie;* and in 1862 Ingres completed *Christ and the Doctors* (Musée Montauban), a work commissioned many years before by Queen Marie Amélie for the chapel of Bizy. On January 14, 1867, Ingres died, in his eighty-eighth year, having preserved his faculties in wonderful perfection to the last.

INGULPHUS [Ingulf], abbot of Crowland, for a long period believed to be the author of the *Historia Monasterii Croylandensis*, was born of English parents. The account of him given at the conclusion of the *Historia* has been shown to be incorrect in several particulars, but according to the authority of Ordericus Vitalis, who visited Crowland three years after the death of Ingulf, he became secretary to William, duke of Normandy, and after taking part in a pilgrimage to Jerusalem, lived as a monk in Normandy, where he rose to the rank of prior. After the accession of William to the throne of England, he in 1085 received the abbatial stall of Crowland, Lincolnshire, where he remained till his death, December 16, 1109.

INHERITANCE. In English law, inheritance, heir, and other kindred words have a meaning very different from that of the Latin *hæres*, from which they are derived. In Roman law the heir or heirs represented the entire legal personality of the deceased—his *universum jus.* In English law the heir is simply the person on whom the real property of the deceased devolves by operation of law if he dies intestate. He has nothing to do as heir with the personal property; he is not appointed by will; and except in the case of coparceners he is a single individual. The Roman *hæres* takes the whole estate; his appointment may or may not be by testament; and more persons than one may be associated together as heirs.

In the United States the English law of inheritance has been more completely repudiated than any other portion of the British system. Each State has established rules of descent for itself, and the observation of Chief Justice Reeve that the nation "has no general law of descents, which probably has not fallen to the lot of any other country," is to some extent justified by the great differences in detail between the rules obtaining in the different States. The following are the rules of most general application, as stated in Kent's *Commentaries on American Law*; twelfth edition, edited by O. W. Holmes, Jr. 1. Real estate shall descend to the lawful descendants of the owner, in the direct line of lineal descent; and if there be but one person, then to him or her alone; and if more than one person, and all of equal degrees of consanguinity to the ancestor, then to the several persons or tenants in common in equal parts, however remote from the intestate the common degrees of consanguinity may be. 2. When the lawful issue are of unequal degrees of consanguinity to the intestate, the inheritance shall descend to the children and grandchildren, if any be living, and to the issue of such as shall be dead, as tenants in common; but such grandchildren and their descendants inherit only such shares as their parents respectively would have taken if living. These two rules are stated to prevail in all the United States, with some important variations, however, in the case of the first rule. 3. In the absence of descendants the inheritance goes to the parents, either first to the father and next to the mother, or jointly under certain conditions. 4. If the intestate dies without issue or parents the estate goes to his brothers and sisters and their representatives. If the relatives are of equal degrees of consanguinity they take in equal parts; but if, of the same degree, some be dead, leaving issue, and others living, the descendants of those who are dead take only their parents' share. Collaterals under this rule would be preferred to ascendants—after parents. "It is, perhaps, universally the rule that brothers and sisters are preferred to grandparents, though the latter stand in an equal degree of kindred." In some States there is no essential distinction left between the whole and the half-blood. in others the half-blood is postponed, but nowhere is it totally excluded. 5. In default of the foregoing, the inheritance generally goes to grandparents, but in some states (New York, New Jersey, and North Carolina) grandparents are excluded, and in others postponed. 6. Next come uncles and aunts and their descendants, taking *per capita* if of equal degree, and *per stirpes* if not. 7. If the inheritance came to the deceased on the part of his father, the father's brothers and sisters would exclude the mother's brothers and sisters, and the mother's brothers and sisters would have a similar preference in respect of property coming to the deceased *ex parte materna*. A similar distinction is observed in some States in applying the fourth rule. 8. On failure of heirs under the preceding rules, recourse is had to the "next-of-kin" as ascertained by the English statute of distributions. In many of the States the harshness of the English rule that natural children have no inheritable blood is greatly mitigated. In Louisiana, if duly acknowledged, they may inherit from both father and mother in the absence of lawful issue.

INJUNCTION, in law, is a judicial process whereby a party is required to refrain from doing a particular thing according to the exigency of the writ. From this definition it is apparent that an injunction is properly a restraining order, although there are instances in which, under the form of a prohibition, a positive order to do something is virtually expressed. Thus in a case of nuisance an injunction was obtained to restrain the defendant from preventing water from flowing in such regular quantities as it had ordinarily done before the day on which the nuisance commenced. But generally, if the relief prayed for is to compel something to be done, it cannot be obtained by injunction, although it may be expressed in the form of a prohibition—as in the case in which it was sought to prevent a person from discontinuing to keep a house as an inn, which is the same thing as ordering to keep an inn. The injunction was used to stay proceedings in other courts "wherever a party by fraud, accident, mistake, or otherwise had obtained an advantage in proceeding in a court of ordinary jurisdiction, which must necessarily make that court an instrument of injustice."

INK (French, *encre;* German, *tinte*), in its widest signification, is the medium employed for producing graphic tracings, inscriptions, or impressions on paper or similar materials. The term includes two distinct conditions of pigment or coloring matter:—the one fluid, and prepared for use with a pen or brush, as writing ink; the other a glutinous, adhesive mass, printing ink, used for transferring to paper impressions from types, engraved plates, and other like surfaces. The latter class may be more properly dealt with under LITHOGRAPHY and PRINTING, (*q.v.*)

Writing inks are fluid substances which contain coloring matter either in solution or in suspension, and very commonly partly in both conditions. They may be prepared in all shades of color, and contain in their composition almost every pigment which can be dissolved or suspended in a suitable medium; but by far the most important of all varieties is black ink, after which red and blue are the colors most commonly employed. Other colors are only occasionally employed; but apart from color there are special qualities which recommend certain inks for limited applications, such as marking inks, ineradicable inks, sympathetic inks, etc.

Among the qualities which should characterize a good black ink for ordinary purposes, the following are important:—It should continue limpid, and flow freely and uniformly from the pen; it should not throw down a thick sludgy deposit on exposure to the air; nor should a coating of mold form on its surface. It should yield distinctly legible characters immediately on writing, which ought to become a deep blue-black, not fading or decaying with age; and the fluid ought to penetrate into the paper without spreading, so that the characters will neither wash out nor be readily removed by erasure. Further, it is desirable that ink should be non-poisonous, that it should as little as possible corrode steel pens, that characters traced in it should dry readily on the application of blotting paper without smearing, and that the writing should not present a glossy varnished appearance. To obtain these characteristics is the chief object of the ink manufacturer; and upon the whole they have hitherto been found best combined in ink prepared from galls, or other sources of tannin, and a salt of iron, with the addition of some coloring matter. Such a compound indeed forms the staple black ink of commerce, which is essentially a ferroso-ferric gallate in extremely fine division held in suspension in water.

The essential ingredients of this ordinary black ink are—first, tannin-yielding bodies, for which Aleppo or Chinese galls are the only eligible materials; second, a salt of iron, the ferrous sulphate (green vitriol) being alone employed; and third, a gummy or mucilaginous agent to keep in suspension the insoluble tinctoral matter of the ink.

Ink which yields by means of pressure an impression, on a sheet of damped tissue paper, of characters written in it is called copying ink. Any ink soluble in water, or which retains a certain degree of solubility, may be used as copying ink. The pigment most commonly employed as the basis of red ink is Brazil-wood, a dyestuff which yields a good, durable ink. For the production of blue ink, the pigment principally used is Prussian blue. China ink or Indian ink is the form in which ink was earliest prepared, and in which it is still made and used in China and Japan for writing with small brushes instead of pens. It is extensively used by architects, engineers, and artists generally, and for various special uses. China ink is prepared in the form of sticks and cakes, which are rubbed down in water for use. It consists essentially of lampblack in very fine condition, baked up with a glutinous substance, and the finer Oriental kinds are delicately perfumed. Marking ink, so called, used principally for marking linen, is composed of a salt of silver, usually the nitrate, dissolved in water and ammonia, with a little provisional coloring matter and gum for thickening. The color resulting from the silver salt is developed by heat and light, and the stain it makes, although exceedingly obstinate, gradually becomes a faint brownish-yellow. Gold and silver inks are writing fluids in which gold and silver, or imitations of these metals, are suspended in a state of fine division. In place of gold, Dutch leaf or mosaic gold is frequently substituted, and bronze powders are also used for preparing a similar kind of ink. Indelible or incorrodible ink is the name given to various combinations of lampblack or other carbonaceous material with resinous substances used for writing which is exposed to the weather or to the actions of strong acids or alkaline solutions.

Sympathetic inks are preparations used for forming characters which only become visible on the application of heat or of some chemical reagent. Many chemicals which form in themselves colorless solutions, but which develop color under the influence of reagents, may be used as sympathetic ink, but they are all of little practical utility.

INLAYING is a method of ornamentation, by incrusting or otherwise inserting in one material a substance or substances differing therefrom in color or nature. The art is practiced in the fabrication of furniture and artistic objects in all varieties of wood, metal, shell, ivory, and colored and hard stone, and in compound substances; and the possible combinations, styles, and varieties of effect are exceedingly numerous. There are several special classes of inlaying, long established and well-recognized details regarding most of which will be found under their separate headings. In the ornamental treatment of metal surfaces *Niello* decoration, applied to silver and gold, is an ancient and much practiced species of inlaying. An art, analogous in effect, called *Bidri*, from Bider in the Deccan, is practiced in India. The inlaying of gold wire in iron or steel is known as damaskeening. In Kashmir, vessels of copper and brass are very effectively inlaid with tin—an art which, like many other decorative arts, appears to have originated in Persia. In the ornamental inlaying of metal surfaces the Japanese display the most extraordinary skill and perfection of workmanship. In the inlaying of their fine bronzes they use principally gold and silver, but for large articles and also for common cast hollow ware (for with them inlaying is common and profuse) commoner metals and alloys are employed. In inlaying bronzes they generally hollow out and somewhat undercut the design, into which the ornamenting metal, usually in the form of wire, is laid and hammered over so as to be firmly inserted. Frequently the famous lacquer-work of the Japanese is inlaid with mother-of-pearl and other substances, in the same manner as is practiced in ornamenting lacquered papier-mache among Western communities. The Japanese also practice the various methods of inlaying alluded to under damaskeening. The term *Mosaic* (see MOSAIC) is generally applied to inlaid work in hard stones, marble, and glass, but the most important class of mosaics—those which consist of innumerable small separate pieces—do not properly come under the head of inlaying. *Pietra Dura* is a fine variety of inlaid mosaic in which hard and expensive stones—agate, carnelian, amethyst, and the like—are used in relief in marble. Under the head BUHL WORK (*q. v.*) will be found a description of the kind of inlaying, principally brass and tortoiseshell, which was introduced and carried to great perfection by André Charles Boule, who gave his name to this particular style of inlaying. Closely allied to buhl work is the more ancient *Tarsia* work or *Marquetry*, which consists of inlaid woods alone. It has been practiced from remote times, but came into prominence, for the decoration of furniture, in Italy during the Renaissance epoch, and has continued to be a favorite decorative art, varying with changing tastes and styles, to the present day. From India, under the name of Bombay boxes, comes a variety of minute and elaborate work, inlaid in geometrical patterns on wood. The inlaying materials consist of tin wire, sandal wood, sapan wood, ebony, ivory, and stag's horns, and the effect produced by the combination of minute pieces of these various substances is altogether peculiar and distinctive. Certain kinds of ENAMEL (*q. v.*) might also be included among the varieties of inlaying.

INNKEEPERS, LAW RELATING TO. By the common law the United States innkeepers are under certain peculiar obligations, the most important of which are the duty of supplying accommodation to such travelers as may desire it, and their responsibility for the safety of the goods belonging to persons staying in their inns. An inn is a place "instituted for passengers and wayfaring men," and in a recent case, in which the proprietor of a restaurant was prosecuted for refusing refreshment on demand, it was held that a tavern, or shop for the retail of spirits across the counter, is not within the definition, and that a person resident in the neighborhood of the inn is not a traveler. An innkeeper may be indicted for refusing accommodation to a traveler, who may also of course have a remedy by civil action. In some American cases it has been held that the possession of a license does not produce, nor does the absence of a license prevent, the liabilities of an innkeeper at common law. An inn is distinguished from a boarding-house in this, that in the latter the guest is under an express contract for a certain time at a certain rate, in the former under an implied contract from day to day. Even if a boarding-house keeper entertains guests in the capacity of an innkeeper, he is not liable as such to his boarding-house guests.

INNOCENT I., pope from 402 to 417, was, according to his biographer in the *Liber Pontificalis*, the son of a man called Innocent of Albano; but, according to the more trustworthy Jerome, his father was Pope Anastasius I., whom he was called by the unanimous voice of the clergy and laity to succeed. It was during his papacy that the siege of Rome by Alaric (408) took place, when, according to a doubtful anecdote of Zosimus, the ravages of plague and famine were so frightful, and divine help seemed so far off, that papal permission was granted to sacrifice and pray to the heathen deities; the pope happened, however, to be absent from the city on a mission to Honorius at Ravenna at the time of the sack in 410. He lost no opportunity of maintaining and extending the authority of the Roman see as the ultimate resort for the settlement of all disputes; and his still extant communications to Victricius of Rouen, Exuperius of Toulouse, Alexander of Antioch, and others, as well as his action on the appeal made to him by Chrysostom against Theophilus of Alexandria, show that opportunities of the kind were numerous and varied. He took a decided view on the Pelagian controversy, confirming the decisions of the synod of the province of proconsular Africa held in Carthage in 416, which had been sent to him, and also writing in the same year in a similar sense to the fathers of the Numidian synod of Mileve who, Augustine being one of their number, had addressed him. Among his letters are one to Jerome and another to John, bishop of Jerusalem, regarding annoyances to which the first-named had been subjected by the Pelagians at Bethlehem. He died March 12, 417, and in the Romish Church is commemorated as a confessor along with Saints Nazarius, Celsus and Victor, martyrs, on July 28th. His successor was Zosimus.

INNOCENT II., pope from 1130 to 1143, whose family name was Paparesci, his own baptismal name being Gregory, was probably one of the clergy in personal attendance on the antipope Clement III. (Guibert of Ravenna). By Paschal II. he was created cardinal-deacon. In this capacity he accompanied Pope Gelasius II. when driven into France; and by Calixtus II. he was employed on various important missions, such as on that to Worms for concluding the peace concordat with the emperor in 1122, and on that to France in 1123. On February 14, 1130, he was hurriedly chosen to succeed Honorius II.; soon afterward an opposition asserted itself which issued in the counter-election of Pietro Pierleoni as Pope Anacletus II. Unable to maintain his position in Rome, Innocent took ship for Pisa, and thence sailed by Genoa to France, where the influence of Bernard of Clairvaux readily secured his cordial recognition by the clergy and the court; in October of the same year he was duly acknowledged by Lothaire of Germany and his bishops at the synod of Würzburg. In January, 1131, he had also a favorable interview with Henry II. of England; and in August, 1132, Lothaire undertook an expedition to Italy for the double purpose of being crowned by the pope and of setting aside the antipope. The coronation ultimately took place in the Lateran church (June 4, 1133), but otherwise the expedition proved abortive. A second expedition by Lothaire in 1136 was not more decisive in its results, and the protracted struggle between the rival pontiffs was terminated only by the death of Anacletus on January 25, 1138. By the Lateran council of 1139, at which Roger of Sicily, Innocent's most uncompromising foe, was excommunicated, peace was at last restored to the church. Innocent died September 23, 1143, and was succeeded by Celestine II. The doctrinal questions in which he was called on to interfere were those connected with the names of Abelard and Arnold of Brescia.

INNOCENT III., pope from 1198 to 1216, by far the most remarkable of the popes who have reigned under this name, and, if Gregory VII. is excepted, perhaps the greatest of all who have occupied the see of St. Peter, was born at Anagni about 1160. His father, Count Trasimundo of Segni, was a member of the famous house of Conti, from which nine popes, including Gregory IX., Alexander IV., and Innocent XIII., have sprung; his mother, Claricia, belonged to the noble Roman family of Scotti. His own baptismal name was Lothario. After receiving the rudiments of his education in Rome, he studied theology under Peter of Corbeil at Paris, and canon law at Bologna. On his return to Rome in 1181 he became a canon of St. Peter's; and through family influence, combined with the increasing evidence he gave of remarkable ability, his subsequent promotion was rapid. By Gregory VIII. he was appointed one of the subdeacons, and in 1190 (when barely thirty) he was, at the instance of his maternal uncle Clement III., made cardinal-deacon of St. Sergius and St. Bacchus. On the death of Clement (1191), who was succeeded by Celestine III., a member of the rival house of Orsini, Cardinal Lothario was but little employed in church affairs; the unsought leisure which he now possessed he devoted to the composition of three works, two of which have come down to our times. On the death of Celestine III. (January 8, 1198), Lothario was without a day's delay unanimously chosen to succeed him; his ordination to the priesthood (hitherto he had held only deacon's orders), his episcopal consecration, and his coronation as pope (February 22, 1198), followed one another in rapid succession. The state of Europe and of the known world at that juncture was such as might have suggested even to a less able and energetic man than Innocent the ambition of once more seeking to obtain for the papacy that absolute supremacy, both spiritual and temporal, in the struggle for which his great predecessor Gregory, more than a century before him, had lost his throne, and, one might almost say, his life. The owner of the crown of Naples (Frederick II., born 1197) was an infant, incapable of protecting his dominions from the numerous adventurers by whom they were overrun; the Lombard republics were at deadly feud with one another, or rent by increasing domestic faction; the empire was convulsed by the struggles of the rival claimants to the throne rendered vacant by the death of Henry VI.; in France Philip Augustus since 1180 had been disgusting his subjects with his tyranny and scandalous vice; at Constantinople the cruel and wicked Alexius III., after dethroning his elder brother Isaac Angelus, was struggling to maintain his precarious grasp of the scepter, while the kingdom of Jerusalem, which half a century before had extended along nearly the whole coast of Syria, was now almost entirely confined to the city of Acre. Innocent's first care was to deliver Rome itself from the claims to supreme authority asserted by the prefect, who for many years had been nominated by the emperor, but whom now he compelled to swear allegiance to himself, thus for the first time practically establishing the temporal sovereignty of the bishop of Rome over his own city. In another direction the popular rights in connection with the choice of a "senator" were curtailed. Measures were next taken to free the so-called patrimony of St. Peter from the various German adventurers who, professing to hold the empire, had divided it among them. Markwald of Anweiler, duke of Ravenna, was by a papal army driven from the March of Ancona, with which he had been invested, and compelled to withdraw to the south of Italy; Conrad of Lutzenberg, duke of Spoleto, was driven into Germany; Innocent personally visited Reate, Spoleto, Perugia, Todi, and everywhere was welcomed as sovereign and deliverer. His claim to the sovereignty of the duchy of Tuscany as heir of the countess Matilda, Hildebrand's friend, was successfully asserted next; and on the death of Constanti, widow of Henry VI. of Germany, Innocent, who had been acknowledged by her as liege lord, became, as guardian of the young Frederick II., master of the kingdom of Naples and Sicily. By the help of Walter of Brienne, Diephold of Acerra was compelled to relax his hold of Apulia; and in 1202 the death of Markwald at Palermo removed one of the most vigorous of the many troublers of Italian peace. The rivalry between Philip of Swabia, brother of Henry VI., and the Guelph Otto of Brunswick, for the imperial crown, in the next place offered a favorable opportunity for intervention in German politics after the more immediately pressing affairs of Rome and Italy had been settled. The tardy (but not reluctant) decision finally given

(March, 1201) by Innocent in favor of the Guelph did not indeed avert protracted civil war, resulting in humiliation and disaster both to emperor and pope; yet ultimately the murder of Philip (June 21, 1208) paved the way for the peaceful coronation of Otto in the following year, and the long-continued efforts of Innocent seemed to have met with an absolute success when the new emperor not only ratified previously exacted promises faithfully to maintain the territories, fiefs, and rights of the see of Rome as these had been defined by the see itself, but also renounced even the small share in episcopal elections which had been reserved to the empire in the concordat of Worms. The triumph, it is true, proved a hollow one; Otto soon broke his oath, claiming the kingdom of Apulia as a fief of the empire, and losing no time in commencing a war for the subjugation of Naples. Nor did his excommunication in 1211 result greatly to the advantage of the papacy, except in so far as it strikingly showed how dangerous to the individual was a collision with the supreme spiritual power. The battle of Bouvines (July 27, 1214) finally disposed of the last hopes of Otto, but by it there was left master of the field one who was destined to prove still more formidable in his opposition to ecclesiastical ascendancy. The immense influence which the energy, persistence, and political skill of Innocent enabled him to wield throughout the whole duration of his pontificate in the affairs of the empire was equally exemplified in his relations with almost every other state of Christendom. Thus one of his first acts after his accession was to signify his disapproval of the conduct of Philip Augustus of France in dismissing his lawful wife Ingeburga of Denmark. By a rigorous interdict laid upon the kingdom from December, 1199, to September, 1200, the headstrong and refractory king was at last compelled to take her back with all the honor due to the queen of France. So, when in England King John began to persecute the clergy in consequence of their adherence to the cause of Stephen Langton, the papal nominee to the archbishopric of Canterbury (1207), his own excommunication followed forthwith; the kingdom was laid under an interdict (March 24, 1208), his subjects released from their allegiance, and his throne offered to any conqueror, with effects which again were far from being such as Innocent had anticipated, but which could not fail to impress the minds of the men of that time with a new and deep sense of the vigor and far-reaching power of the vicars of Christ. In Castile, in Portugal, in Leon, in Navarre, in Denmark, Bohemia, Poland, Hungary, the same story repeats itself, with equal distinctness, if with less prominent results. Another outlet of the zeal and ambition of Innocent was found in the fifth crusade, the leading events of which, including the pact with Venice and the fall of Constantinople, have been elsewhere related. In the west also, a new crusade against heretics was set on foot with relentless energy, which has been described in the article ALBIGENSES. The principles upon which such enterprises ought to be conducted were formulated under the presidency of Innocent at the fourth Lateran council (1215). It was there decreed that all rulers should promise to tolerate no heretics within their dominions, and that any prince who should refuse to comply with an injunction of the church to purge his dominions of heresy was to be punished with excommunication, and in case of contumacy to be deposed, if necessary, by force of arms. To those who should take part in such application of armed force when declared necessary, immunities similar to those enjoyed by the Eastern crusaders were guaranteed. At the same time very stringent laws were made with reference to the Jews. Their disability to hold any public appointment of trust was declared, and they were prohibited from at any time wearing Christian apparel, and also from appearing in public at all during Holy Week. This council was held by Innocent in the full consciousness of his approaching dissolution, which took place at Perugia on July 16, 1216. He was succeeded by Honorious III.

INNOCENT IV., Sinibaldo de Fieschi, pope from 1243 to 1254, belonged to one of the first families of Genoa, and, educated at Parma and Bologna, passed for one of the best canonists of his time. He had for his immediate predecessor Celestine IV., who, however, was pope for eighteen days only, and therefore the events of Innocent's pontificate practically link themselves onto those of the reign of Gregory IX. It was on occasion of Innocent's election (June 28, 1243) that Frederick II. is said to have remarked that he had lost the friendship of a cardinal and gained the enmity of a pope; the letter which he wrote, however, expressed in respectful terms the hope that an amicable settlement of the differences between the empire and the papal see might be reached. The negotiation which shortly afterward began with this object speedily proved abortive, Frederick being unable to make the absolute submission to the pope's demands which was required of him. Finding his position in Rome insecure, Innocent secretly withdrew in the summer of 1244 to Genoa, and thence to Lyons, where he summoned a general council which met in 1245 and deposed Frederick. The agitation caused by this act throughout Europe terminated only with Frederick's death in 1250, which permitted the pope to return, first to Perugia, and afterward in 1253 to Rome. The remainder of his life was largely devoted to schemes for compassing the overthrow of Manfred, the natural son of Frederick II., whom the towns and the nobility had for the most part received as his father's successor. It was on a sick bed at Naples that Innocent heard of Manfred's victory at Foggia, and the tidings are said to have precipitated his death (December 7, 1254). He was succeeded by Alexander IV.

INNOCENT V., pope from January 20 to June 22, 1276, was a native of Tarantasia in Burgundy, where he was born in 1225. His predecessor was Gregory X., and he was succeeded by Hadrian V.

INNOCENT VI., Stephen Aubert, pope, at Avignon, from 1352 to 1362, the successor of Clement VI., was a native of the diocese of Limoges, and, after having taught civil law at Toulouse, became bishop, successively, of Noyon and of Clermont. In 1342 he was raised to the dignity of cardinal. On the death of Clement VI., after the cardinals had each bound himself by a solemn agreement as to a particular line of policy should he be elected, Aubert was chosen (December 18, 1352); one of the first acts of his pontificate was to declare the paction to have been illegal and null. His subsequent policy compares favorably with that of the other Avignon popes He brought about many needed reforms in the administration of church affairs, and, by his legate, Cardinal Albornoz, who was accompanied by Rienzi, he sought to restore order in Rome, where, in 1355, Charles IV. was, with his permission, crowned, after having previously come under an oath that he would quit the city on the day of the ceremony. It was largely through the exertions of Innocent that the peace of Bretigny (1360), between France and England, was brought about. During this pontificate, also, John Palæologus offered to submit the Greek Church to the Roman see, on condition of assistance being rendered him against John Cantacuzenus. The resources at the disposal of the pope, however, were all required for exigencies nearer home, and the offer was declined. Innocent was a liberal patron of letters, and, if the extreme severity of his measures against Fraticelli be kept out of account, had a deservedly high reputation for justice and mercy. He died September 12, 1362, and his successor was Urban V.

INNOCENT VII., Cosimo de Migliorati, pope from 1404 to 1406, was a native of Solmona, in the Abruzzi, and early distinguished himself by his learning both in civil and in canon law. By Urban VI. he was called to the papal court, and intrusted with various responsible offices, being finally promoted to the archbishopric of Ravenna, and afterward to the bishopric of Bologna. Boniface IX. made him cardinal, and employed him as legate in several delicate and important missions. On the death of Boniface, Migliorati was unanimously chosen (October 17, 1404) to succeed him, after each of the cardinals had bound himself by a solemn obligation to employ all lawful means for the restoration of the church's unity in the event of his election, and even to resign the papal dignity should that be considered necessary to this end. The election was resisted at Rome by the Ghibelline party, but peace was maintained by the aid of Ladislaus, of Naples, who thus laid Innocent under embarrassing obligations, from which he freed himself at the earliest possible moment. The assassination of some leading members of the city-party by Ludovico Migliorati (a nephew of Innocent) and his friends compelled the pope to take refuge, in August, 1405, at Viterbo, whence he did not return until January of the following year. These troubles furnished him with a pretext, of which he was not unwilling to avail himself, for postponing the meeting of a general council which was urged by Charles, of France; the university of Paris, Rupert, of Germany; and John, of Castile, as the only means of healing the schism which had prevailed so long. It is hardly necessary to say that he showed no favor to the proposal that he, as well as the antipope, Benedict XIII., should resign in the interest of peace. He died somewhat suddenly at Rome on November 6, 1406. There is no evidence of the truth of the allegation that his death was not due to natural causes. His successor was Gregory XII.

INNOCENT VIII., Giovanni Battista Cibo, pope from 1484 to 1492, was born at Genoa (1432), and was the son of a man of senatorial rank. His early years were spent at the Neapolitan court, and subsequently he went to Padua and Rome for his education. In the latter city the influence of his friends procured for him, from Paul II., the bishopric of Savona, and in 1473 he was made cardinal by Sixtus IV., whom he succeeded on August 29, 1484. Shortly after his coronation he addressed a fruitless summons to Christendom to unite in a crusade against the infidels; the amount of his own zeal may in some degree be estimated from the fact that in 1489, in consideration of a yearly sum of 40,000 ducats and a gift of the spearhead which had pierced the Savior's side, he consented to favor the sultan Bajazet II. by detaining his fugitive brother in close confinement in the Vatican. In 1486 Henry VII. of England was declared to be the lawful holder of the English crown by the threefold right of conquest, inheritance and popular choice. Innocent, in his bull "Summis desiderantes" (December 5, 1484), instigated very severe measures against magicians and witches in Germany; the principles enunciated by him were afterward embodied in the *Malleus maleficarum* (1487). He it was also who in 1487 appointed Torquemada to be grand inquisitor of Spain; he also urged a crusade against the Waldensians, offering plenary indulgence to all who should engage in it. In 1486 he prohibited, on pain of severe ecclesiastical censures, the reading of the nine hundred propositions of Pico Mirandola. An important event of his pontificate was the fall of Granada (January, 1492), which was celebrated in the Vatican with great rejoicings. He died July 25, 1493, leaving behind him numerous children toward whom his nepotism had been as lavish as it was shameless. His successor was Alexander VI.

INNOCENT IX. succeeded Gregory XIV. on October 29, 1591, and died on December 30th of the same year. His pontificate was unimportant. Clement VIII. was his successor.

INNOCENT X., Giovanni Battista Pamphili, pope from 1644 to 1655, was born at Rome in 1574, attained the dignity of cardinal in 1629, and through French influence was chosen to succeed Urban VIII. on September 15, 1644. Throughout his reign the influence exercised over him by Olympia Maidalchina, his deceased brother's wife, was very great, and such as to give rise to gross scandal, for which, however, there appears to have been no adequate ground. He naturally enough objected to the conclusion of the peace of Westphalia, against which his nuncio in his name vainly protested, and against which he issued the bull "Zelo domus Dei" in November, 1648. The most important of his doctrinal decisions was his condemnation of the five Jansenist propositions in 1653. The avarice of his female counselor gave to his reign a tone of oppression and sordid greed which probably it would not otherwise have shown, for personally he was not without noble and reforming impulses. He died January 5, 1655, and was succeeded by Alexander VII.

INNOCENT XI., Benedetto Odescalchi, pope from 1676 to 1689, was born at Como in 1611, studied law at Rome and Naples, held successively the offices of prothonotary, president of the apostolic chamber, commissary of the Marca di Roma, and governor of Macerata; in 1647 Innocent X. made him cardinal, and he afterward successively became legate to Ferrara and bishop of Novara. Two months after the death of Clement X. he was (September 21, 1676), in spite of French opposition, chosen his successor. He lost no time in declaring and practically manifesting his zeal as a reformer of manners and a corrector of administrative abuses. He sought to abolish sinecures, and to put the papal finances otherwise on a sound footing; beginning with the clergy, he sought to raise the laity also to a higher moral standard of living. Some of his regulations with the latter object, however, may raise a smile as showing more zeal than judgment. Personally not unfriendly to Molinos, he nevertheless so far yielded to the enormous pressure brought to bear upon him as to confirm, in 1687, the judgment of the inquisitors, by which sixty-eight Molinist propositions were condemned as blasphemous and heretical. His pontificate was marked by the prolonged struggle with Louis XIV. of France on the subject of the so-called "Gallican Liberties," and also about certain immunities claimed by ambassadors to the papal court. He died after a long period of feeble health on August 12, 1689, and was succeeded by Alexander VIII.

INNOCENT XII., Antonio Pignatelli, pope from 1691 to 1700, was the successor of Alexander VIII. He came of a distinguished Neapolitan family, and was born March 13, 1615. Educated at the Jesuit college in Rome, he in his twentieth year became an official of the court of Urban VIII.; under successive popes he served as nuncio at Florence and Vienna and in Poland; and by Innocent XI. he was made cardinal (1681) and archbishop of Naples. Immediately after his election (July 12, 1691), he declared against the nepotism which had long been one of the greatest scandals of the papacy; the bull "Romanum decet Pontificem," issued in 1692, prohibited popes in all time coming from bestowing estates, offices, or revenues on any relative; at the same time he sought to check the simoniacal practices of the apostolic chamber, and in connection with this to introduce a simpler and more economical manner of life into his court. He introduced various much-needed reforms into the States of the Church, and for the better administration of justice erected the Forum Innocentianum. In 1693 he compelled the French bishops to retract the four propositions relating to the "Gallican Liberties" which had been formulated by the assembly of 1682. His pontificate contrasted with that of a series of predecessors in having marked leanings toward France instead of Germany. This benevolent, self-abnegating, and pious pope died on September 27, 1700, and was succeeded by Clement XI.

INNOCENT XIII., Michael Angelo Conti, pope from 1721 to 1724, was born in 1655, and became cardinal under Clement XI. in 1706. From 1697 to 1710 he acted as papal nuncio to the kingdom of Portugal, where he is believed to have formed those unfavorable impressions of the Jesuits which afterward influenced his conduct toward them. In 1721 his high reputation for ability, learning, purity, and a kindly disposition secured his election to succeed Clement XI. His pontificate was prosperous, but comparatively uneventful. He prohibited the Jesuits from prosecuting their mission in China, and ordered that no new members should be received into the order. This indication of his sympathies encouraged some French bishops to approach him with a petition for the recall of the bull "Unigenitus" by which Jansenism had been condemned; the request, however, was peremptorily denied. Innocent XIII., like his predecessor, showed much favor to the English Pretender, "James III.," and liberally supported him. He died March 7, 1724, and was succeeded by Benedict XIII.

INNSBRUCK, or INNSPRUCK (pop. 20,537), the chief town of the Tyrol, Austria, is situated on the right bank of the Inn, not far from its junction with the Sill, in a beautiful valley surrounded by lofty mountains, which seem to overhang the town. It is connected with its suburbs on the left bank of the stream by three bridges. The old wooden bridge, which was the scene of a fierce struggle between the Tyrolese and the Bavarians in 1809, was replaced in 1871–72 by a handsome iron structure, and the banks of the Inn have, during the last few years, been widened and planted with trees. Innsbruck is the seat of the law courts and the usual administrative offices for the district of Tyrol and Vorarlberg. The Franciscan or court church (1553–1563), in the Renaissance style, contains several works of art, of which the chief is the imposing cenotaph of the emperor Maximilian I. In the same church are the monuments of the patriots Hofer, Haspinger, and Speckbacher, and one in memory of the Tyrolese who fell in defense of their country between 1796 and 1809. The silver chapel of the church contains a silver Madonna and altarpiece, and the graves of Archduke Ferdinand II. and his wife Philippa. In this church Christina of Sweden, daughter of Gustavus Adolphus, publicly adopted the Roman Catholic faith in 1654. There are numerous monastic institutions, including a Jesuits' college, and a Capuchin convent, begun in 1593 as the first of the order in Germany. The university, founded in 1672, and, after being twice suspended, finally reinstituted in 1826, had in 1900–01 a teaching staff of ninety-three, and (1900–01) 1,019 students. It possesses a fine library. The Ferdinandeum, an interesting national museum, wss founded in 1845, and is maintained by private enterprise. The manufactures of Innsbruck comprise woolen and cotton goods, stained glass, leather, and machinery; and there is considerable transit trade between Italy and Austria.

INNS OF COURT. The Inns of Court and Chancery are voluntary non-corporate legal societies seated in London, having their origin about the end of the thirteenth and the commencement of the fourteenth century.

Dugdale (*Origines Juridiciales*) states that the learned in the laws were anciently persons in holy orders, the justices of the king's court being bishops, abbots and the like. But in 1207 the clergy were prohibited by canon from acting in the temporal courts. The result proving prejudicial to the interests of the community, a commission of inquiry was issued by Edward I. (1290), and this was followed up (1292) by a second commission, which, among other things, directed that students "apt and eager" should be brought from the provinces and placed in proximity to the courts of law fixed by Magna Charta at Westminster. These students were accordingly located in what became known as the Inns of Court and Chancery, the latter designated by Fortescue (*De Laudibus*) as "the earliest settled places for students of the law," the germ of what Sir Edward Coke subsequently spoke of as the English judicial university. In these Inns of Court and Chancery, thus constituted, and corresponding to the ordinary college, the students, according to Fortescue, not only studied the laws and divinity, but further learned to dance, sing, and play instrumental music, "so that these hostels, being nurseries or seminaries of the court, were therefore called Inns of Court."

Stow, in his *Survey* (1598), says: "There is in and about this city a whole university, as it were, of students, practicers or pleaders, and judges of the laws of this realm;" and he goes on to enumerate the several societies, fourteen in number, then existing, corresponding nearly with those recognized in the present day, of which the Inns of Court, properly so called, are and always have been four, namely, *Lincoln's Inn*, with the subordinate Inns of Chancery, Furnival's Inn and Thavie's Inn; the *Inner Temple*, with Clifford's Inn and Clement's Inn; the *Middle Temple*, with New Inn; and *Gray's Inn*, with Staple's Inn and Barnard's Inn. In addition to these may be specified *Serjeant's Inn*, a society composed solely of serjeants-at-law, which, however, ceased to exist in 1877. Besides the Inns of Chancery above enumerated, there were others, such as Lyon's Inn, which was pulled down as recently as 1868, and Scrope's Inn and Chester or Strand Inn, spoken of by Stow, which have long been removed, and the societies to which they belonged have disappeared. The four Inns of Court stand on a footing of complete equality, no priority being conceded to or claimed by one inn over another. Their jurisdictions and privileges are equal and upon affairs of common interest the benchers of four inns meet in conference. From the earliest times there has been an interchange of fellowship between the four houses; nevertheless the Middle Temple and Lincoln's Inn, and the Inner Temple and Gray's Inn, have maintained a closer alliance.

The members of an Inn of Court consists of benchers, barristers, and students. The benchers are the governing bodies of the inns, and are composed of the senior members, designated also more formally "masters of the bench." They are self-elected, and unrestricted as to numbers; usually, but not invariably, a member of an inn, on attaining the rank of queen's counsel, is invited to the bench. Other members of long standing are also occasionally chosen, but no member by becoming a queen's counsel or by seniority of standing acquires the right of being nominated a bencher. The benchers thus elected vary in number from twenty in Gray's Inn to seventy and upward in Lincoln's Inn and the Inner Temple. The powers of the benchers are practically without limit within their respective societies; their duties, however, are restricted to the superintendence and management of the concerns of the inn, the admission of candidates as students, the calling of them to the bar, and the exercise of discipline generally over the members. The judges of the superior courts are the visitors of the inns, and to them alone can an appeal be had when either of the societies refuses to call a member to the bar, or to reinstate in his privileges a barrister who has been disbarred for professional or other misconduct. The meetings of the benchers are variously denominated a "parliament" in the Inner and Middle Temples, a "pension" in Gray's Inn, and a "council" in Lincoln's Inn. The presiding or chief officer is the treasurer, one of the benchers, who is elected annually to that dignity. Under the term barrister are included generally all those members of an Inn of Court who, after due probation, and being at least twenty-one years of age, have been called to that rank by the benchers of the inn of which they have been students.

INOCULATION. See SMALLPOX.

INOWRAZLAW, anciently Jung-Breslau, the chief town of a circle in the government district of Bromberg, is situated on an eminence in the most fertile part of the Prussian province of Posen, twenty-five miles southeast of the town of Bromberg. Population, 13,548.

INQUEST. See CORONER.

INQUISITION, THE, is the name usually given to that organization which was established in Spain in the fifteenth century for the detection and suppression of heresy. The "Holy Office," as it was styled, was, however, only the development of a system which, in the hands of the preaching orders, had existed from the beginning of the thirteenth century; and this in turn did but enforce anew the old view that the church is bound to correct all immorality or misbelief. The subject has therefore three distinct periods:—(1) the treatment of heresy and vice before the thirteenth century; (2) the Dominican Inquisition, dating from the council of Toulouse in 1229; (3) the Spanish Inquisition, which began in 1480. The second and third periods express a different principle from that which guided the first; for the earlier inquiry into heresy or vice was a part of the episcopal functions, while the second period sprang out of the anti-episcopal and anti-feudal revival of the preaching orders, and the third went with the establishment of a centralized monarchy in Spain, and its claims to a political-religious supremacy in Europe. The first was not directed against any special heresy; the second was called forth by the Albigensian movement, and the literary and artistic independence of southern France; the third expressed the views of Spanish orthodoxy in its struggle with Jew and Moor, and, when that contest was done, it attacked Protestantism, becoming, in union with the Jesuits, the fighting power of the Catholic reaction of the sixteenth century. The original episcopal Inquisition never forgave its more vigorous and better organized successor; the Spanish Office was nowhere introduced without a struggle, but the Reformation left episcopacy almost powerless in northern Europe, while in the south the renewed and autocratic papacy discouraged the independence of bishops, and trusted itself mainly to the order of Jesus and the Holy Office.

The germ of the Inquisition lies in the duty of searching out and correcting error intrusted to the deacons in the early churches. The promise in the Anglican Ordinal that the priest will be "ready with all faithful diligence to banish and drive away all erroneous and strange doctrines contrary to God's word" is a pale reflection of this ancient charge. The episcopacy thus providing the instruments, temporal power soon offered to enforce the sentences of the church; the edicts of Constantine and his successors now began that double system which, by ordaining that heretics should be dealt with by the secular arm, enabled the church to achieve her object without dipping her own hands in blood. Thus, about 316, Constantine issued an edict condemning Donatists to lose their goods; and in 382 Theodosius declared the Manichæans deserving death, and confiscated their goods. Later on, in 769, we learn in the capitularies of Charles the Great that each bishop must visit all his diocese, teach truth, correct morals, see that the clergy hold the right faith, and, on the Saxon border, stop the use of any pagan rites. Charles the Bald in 844 orders the bishops to preach and confirm the people, and to inquire into and correct their errors. In this inquisition, as in other matters, the church long felt the impress of the organizing power of Charles the Great; it helped forward the episcopal dominance in the ninth and tenth centuries.

But when a time of new life came to Europe early in the thirteenth century, and orthodoxy was threatened by the brilliant speculations of southern France, a great revival in the church met the independent movement outside, and the rise of the Preaching Friars gave a new direction to the relations between religion and the world. To this period we owe the technical use of the terms Inquisitor and Inquisition. Hitherto they had signified, specially in France, officers inquiring into matters of taxation; henceforth they are applied to the more ominous inquiry into orthodoxy. At the council of Tours in 1163, in the time of Alexander III., the title of Inquisitor was first applied in this sense. But the thing was far older than the name. In 1184 the synod of Verona cursed all heretics and their shelterers, ordered relapsed persons to be handed over to the secular arm for capital punishment, confiscated their property, and clearly indicated that the New Inquisition would go far beyond the older episcopal function. The synod did not hesitate to threaten easy-going bishops, urging them to more frequent and more searching visitations, standing over them as a superior power. And henceforward Inquisition became more systematized, with papal not episcopal authority; it was developed by those three masterful pontiffs, Innocent III. (1198–1216), Gregory IX. (1227–1241), and Innocent IV. (1243–1254), who all, regarding the supremacy of Rome as the keystone of society, claimed authority over men's souls and bodies, above the authority of prince or bishop.

But little success attended the efforts of the earlier Inquisitors till they were joined by the too famous Castilian Dominic, who, having in 1215 accompanied the bishop of Toulouse to Rome, laid before the pope a scheme for a new order of preaching friars, whose special function should be the overthrow of heresy. Innocent III. approved the order in 1215, and Honorius III. confirmed it 1216. It spread swiftly through Europe, and the charge of the Inquisition was soon intrusted almost entirely to it. Hitherto there had been no regular tribunal; now, as the war in southern France went on and the strife became more fierce, a stricter organization was introduced. While the strong current of independent opinion was being stemmed in Italy, Provence, France, and Spain, the resistance gave compactness to the new system. St. Dominic established three orders—(1) his friars, (2) a female order, and (3) the "Militia of Christ," an order of laymen, married chiefly, and noble, who became the working force of the inquisitorial system. They were also styled "the Familiars of the Holy Office."

It is, however, to Gregory IX. that the Inquisition owes its definite form. In the synod of Toulouse in 1229 it was agreed that each bishop should appoint one priest, and one, two, three, or even more laymen, to inquire, under oath and with much secrecy, into heresy.

in 1234 the Dominicans were specially intrusted with the inquisitorial office in Toulouse. From their tribunal there was no appeal to the bishop, who fell into the background, all appeals being directed to Rome alone. To this end Urban IV. appointed, in 1263, an inquisitor-general to be the medium of communication between the papacy and the local inquisitors, in hopes of stopping the delay of business caused by the absence of officials in Rome on appeal questions. This office, however, fell into abeyance till revived by Paul III. in the person of Caraffa in 1542.

From Provence the organization of the Inquisition soon passed into France, where, in 1255, Alexander IV. named the provincial of the Dominicans and the head of the Franciscans at Paris his inquisitors-general for France at the urgent request of Saint Louis, whose piety was of the narrowest crusading type. The Gallican Church stoutly resisted this ultramontane interference; the bishops gave it no help; churches and abbeys became asylums for the victims of the Holy Office; and the new movement had consequently but very partial success. It was more effectively used by Philip the Fair to crush the Templars, though that greedy prince quickly interfered when he found the Inquisition laying hands on his special preserve, the wealthy Jews. Charles V., moved to new efforts by Gregory XI., imprisoned large crowds of Frenchmen for heresy, and to meet the pressure erected several new prisons, among them the ill-omened Bastille. After this the Inquisition was quiet in France till the Reformation once more aroused it in the time of Francis I. In Spain it was introduced by Pope Gregory IX., in 1232, and had a far more active and continuous life; we have a minute account of its system and procedure in the *Directorium Inquisitorum* of N. Eymerich, inquisitor-general for Castile in 1356. This work, based entirely on the writer's personal knowledge and experience, gives us full insight into the way in which cases were got up and handled; we see the spy system, the delation, the mysterious secrecy, the scandal of the "question;" the shameless union in one person of accuser and judge, the unscrupulous hindrances put in the way of the victim's defense, the direct interest of the tribunal in condemning—for condemnation affirmed vigilance and orthodoxy, while it secured to the Holy Office the wealth of the accused, and the accused were usually among the wealthiest in the land. We can trace the absolute injustice of the institution on every page, and must only wonder that even in those days men could endure its existence. In Italy the Inquisition was established under Dominican supervision as early as 1224; Simone Memmi's famous fresco of the "Domini Canes" in S. Maria Novella at Florence, with its black and white hounds chasing off the wolves from the holy fold, bears living witness to the power of the institution and its influence over the Italian imagination. Inquisitors were at a later time brought into England to combat the Wickliffite opinions.

Though it succeeded, with help of the terrible lay-crusade, in southern France, the Inquisition seemed unequal to the problem laid before it in Spain, where, instead of simple-hearted Albigensians, it had to deal with rich and crafty Jews and highly-trained Moors. Forced to profess a Christianity which they hated, they loathed the worship of Virgin or saint, the pictured or graven effigy of the Christ, the thousand objects of mediæval worship, all which to their eyes were mere idolatries; their allegiance to such a faith was that of compulsion, which fostered the bitterest sense of wrong. Between them and the old Catholic Spaniards smoldered a perpetual grudge; the Inquisition seemed unable to overcome the evil. When, however, Castile and Aragon were united by Ferdinand and Isabella, political aims as well as religious fanaticism demanded more stringent measures against independent thought; the war of Louis XIV. against freedom of opinion was not more distinctly political than that of the two monarchs, although his machinery was more civil and military than theirs.

Three chief motives led to the reorganization of the Inquisition in Spain:—(1) the suspicions and ill-feeling against the new Christians; (2) the wish of Ferdinand and Isabella to strengthen the compactness of their union, threatened by the separatist tendencies of the wealthy Jews and Moors; and (3) above all, the hope of a rich booty from confiscations, a characteristic which specially marks the history of the Spanish Inquisition. The motive of strictly religious fanaticism influenced, not the monarchs, but the Dominican instruments of the Holy Office. And so when in 1477 Friar Philip de Barberi, inquisitor for Sicily, came to Seville for the confirmation of his office, and pressed on Ferdinand the great advantages of a revived system on the Sicilian plan, the king, led by his hunger for gold, and the queen, guided by her piety, were easily persuaded, and sent to Rome to solicit the establishment of such a tribunal as Barberi suggested. Sixtus IV. in 1478 acceded to their request; his bull for this purpose is, however, lost. But as Isabella wished first to try gentler measures, and as both monarchs were rather alarmed by the independence the proposed tribunal claimed, the papal permission was not made known or acted on till 1480. The monarchs bargained that they should nominate the inquisitors, hoping thereby to secure a control over the institution; but the real center of authority was inevitably Rome, and from its outset the Holy Office was ultramontane.

The first inquisitors, named in 1480, were Dominicans; their tribunal was established at Seville, where they were but sullenly received. Early in 1481 they began work, and, before that year was out, had burnt 298 victims in Seville alone, besides many effigies of those who had happily escaped. The Jesuit historian Mariana assures us that in this year full 2,000 were burnt in the archbishopric of Seville and the bishopric of Cadiz; the Quemadero, or cremation-place, built at this time by the prefect of Seville, not far from that city, a square platform of stone, was a grim altar on which the lives of almost daily victims ascended in clouds of smoke to heaven. This new blessing, however, was but unwillingly welcomed by the Spaniards; the capital of Castile remembered its ancient learning and splendor and the wealth and intelligence of its old Moorish inhabitants; complaints and protests poured in on Sixtus IV., especially from the bishops; and in 1483, in one of his briefs, the pope actually ordered a softening of the rigors of the Holy Office; he also named the Archbishop of Seville, D. Inigo Manriquez, his sole judge of appeals in matters of faith, hoping thereby to still the strong jealousy of the episcopate. He was also somewhat offended because Ferdinand and Isabella held back the papal share of the spoils.

Shortly afterward, October, 1483, the Dominican father Thomas of Torquemada (de Turrecremata) was named by Sixtus IV. inquisitor-general for Castile and Leon. From him the institution received its full organization. He became its president; by his side were two lawyers as assessors, and three royal counselors. This scheme was not large enough for the work; it was shortly amended, and there was now a central court styled the Consejo de la Suprema, composed of the grand inquisitor-general, six apostolical counselors, a fiscal procurator, three secretaries, an alguazil (or head policeman), a treasurer, four servants of the tribunal, two reporters or informers, and as many consultors as might be needful. Under this central tribunal four local tribunals were also appointed. All the officials were well paid from the confiscation fund; it was the interest of all that that stream of wealth should never run dry; Torquemada was to the full as eager as Ferdinand for profit from this unholy source: the chief spoils of the institution fell to the crown; the true accession of strength was at Rome.

This royal council of the Inquisition, as it was now styled, proceeded next to draw up its rules. Torquemada, in 1484, summoned to Seville all heads of local tribunals, who presently published a code of thirty-nine articles. The dreary list regulates the procedure of the Holy Office. The articles were originally twenty-eight; of these 1 to 10 deal with the summons to heretics to come forward and confess, and with the penalties to the submissive; 11 to 13 with penitents in the prisons of the Office; 14 to 19 treat of the procedure of trial, including torture; 20 and 21 extend the jurisdiction of the tribunal to dead heretics and the vassals of living nobles; the remainder are on points of detail in the management.

The Holy Office had now free scope for its work, and its procedure, arranged by Torquemada, will explain how thoroughly it succeeded in terrifying all who came within its reach. When an accused or suspected person was first delated to the Inquisition, a preliminary inquiry was held, and the result of it laid before the tribunal. If the tribunal thought it a case for interference, and it usually did so, the informers and witnesses were reëxamined, and their evidence, with all suspicious circumstances which zeal could rake together, drawn out and submitted to a body of monastic theologians called "the Qualifiers of the Holy Office." The character of these officials was at stake, and their honor involved; they could hardly be expected to report well of the accused, or there might be a suspicion of their own orthodoxy. When they had given in their opinion against the accused, he was at once removed to the secret prison of the office, where all communication with the outer world was entirely cut off from him. Then followed three "first audiences," in which the officials did their utmost to wring a confession out of him, so that he might be made to rank as a penitent, and enjoy the charity of his persecutors. If, however, he was stiff, the charges against him were re-formed, and the fiscal in charge of the case demanded torture to extort confession. This in the early times of the institution followed frequently, and had many forms of ingenious cruelty, as to which Llorente, who had good means of judging, declares that "none of the descriptions of them can be accused of exaggeration." After torture, the shattered victim was carried to the audience chamber, and called on to make his answer to the charges, which were now read to him for the first time. He was next asked whether he desired to make any defense. If so, he had to choose a lawyer from a list of those employed by his accusers, and the defense was little but a mockery. After this process, which sometimes lasted for months, the qualifiers were again called in, and gave their final opinion, which was almost always adverse, on the whole case. Then followed the sentence, with opportunity of an appeal either to the "Suprema"—which was useless, as being an appeal to the tribunal again—or to Rome. The papal treasury by these appeals obtained a large income; for money was the only valid argument. Thus the Inquisition got the victim's property by confiscation, and the papacy the wealth of his friends in the appeal. If the sentence was, as did sometimes occur, an acquittal, the poor wretch might slink home without redress or recompense for imprisonment, and the agony of the trial and the torture; if it was a condemnation, the victim was made the center of an *auto-da-fé*, dressed in a sanbenito, or condemned man's robe, and eventually, at the open place of execution, informed as to his fate. He might be either "reconciled," and then, as a penitent, had to undergo penalties almost worse than death, or "relaxed," that is, handed over to the secular arm for burning—for the Holy Office shed no blood.

In 1492 the great work began with the persecution and expulsion of the Jews; they were ejected, and their wealth confiscated. There was an enormous crowd of exiles, who wandered to different shores of the Mediterranean, carrying misery and plague in their train. A few years later, under supervision of Cardinal Ximenes, the Moors were also ordered to be converted or to go; the Morescoes, or Christianized Moors, suffered constant persecution throughout the sixteenth century, until finally they, too, were expelled by Philip III. in 1609. Jews, Moors, and Morescoes made up over 3,000,000 of the wealthiest and most intelligent inhabitants of Spain; the loss in trade, agriculture, and manufactures was incalculable; in seventy years the population fell from 10,000,000 to 6,000,000.

The hand of the Holy Office was stretched out against all; no lofty dignity in church or state, no eminence in art or science, no purity of life, could defend from its attacks. It is said to have threatened Charles V. and Philip II.; it persecuted Archbishop Carranza, head of the church in Spain; destroyed De Dominis, archbishop of Spalatro; it smote Galileo, murdered Giordano Bruno, attacked Pico di Mirandola, and even is said to have threatened Cæsar Borgia. With equal vigor, in combination with the Jesuits, the Inquisition made war on books and learning, religious or secular alike; we have seen how baleful was its effect in earlier days on literature and art in Provence, and in the time of the Catholic sovereigns on the material well-being of Spain. "In the love of Christ and his maid-mother," says Queen Isabella, "I have caused great misery, and have depopulated towns and districts, provinces and kingdoms."

The statistics of death at the hands of the Inquisition in Spain given by Llorente show how the institution gradually lost force; the average number in each year steadily diminished after the beginning of the seventeenth century; and in the eighteenth torture was abandoned, and the deaths dropped to two or three or even less in the year. In Italy it was abolished in Parma and Tuscany about 1769, in Sicily in 1782; the spirit of the eighteenth century was all against the Office, though it lingered on. In the Revolution wars Napoleon sternly crushed it wherever he came across it, in Spain in 1808, and in Rome in 1809. Down to 1809 Llorente gives as the figures for Spain alone—burnt alive 31,912, in effigy 17,659, and imprisoned, etc., as penitents, 291,450—a total of 341,021. After the hand of Napoleon was taken off, the institution revived again at Rome and at Madrid; but its teeth were gone; and it could do little but show a murderous will. The last capital punishments were those of a Jew who was burnt, and a Quaker schoolmaster hanged in Spain in 1826. Still its voice is sometimes heard. In 1856 Pius IX. issued an encyclical against somnambulism and clairvoyance, calling on all bishops to inquire into and suppress the scandal, and in 1865 he uttered an anathema against Freemasons, the secular foes of the Inquisition.

INSANITY is a generic term applied to certain morbid mental conditions produced by defect or disease of the brain. The synonyms in more or less frequent use are mental disease, alienation, derangement or aberration, madness, unsoundness of mind. There are many diseases of the general system productive of disturbance of the mental faculties which, either on account of their transient nature, from their being associated with the course of a particular disease, or from their slight intensity, are not included under the head of insanity proper. From a strictly scientific point of view it cannot be doubted that the fever patient in his delirium, or the drunkard in his excitement or stupor, is insane—that, the brain of either being under the influence of a morbific agent or of a poison, the mental faculties are deranged; yet such derangements are regarded as functional disturbances, *i.e.*, disturbances produced by agencies which experience tells will, in the majority of cases, pass off within a given period without permanent results on the tissues of the organ. The comprehensive scientific view of the position is, that all diseases of the nervous system, whether primary or secondary, congenital or acquired, should, in the words of Griesinger, be regarded as one inseparable whole, of which the so-called mental diseases comprise only a moderate proportion. However important it may be for the physician to keep this principle before him, it may be freely admitted that it cannot be carried out fully in practice, and that social considerations compel the medical profession and the public at large to draw an arbitrary line between such functional diseases of the nervous system as hysteria, hypochondriasis and delirium on the one hand, and such conditions as mania, melancholia and dementia on the other.

All attempts at a short definition of the term insanity have proved unsatisfactory; perhaps the nearest approach to accuracy is attained by the rough statement that it is *a chronic disease of the brain, inducing chronic disordered mental symptoms*—the term disease being used in its widest acceptation. But even this definition is at once too comprehensive, as under it might be included certain of the functional disturbances alluded to, and too exclusive, as it does not comprehend certain rare transitory forms. Still, taken over all, this may be accepted as the least defective short definition; and moreover it possesses the great practical advantage of keeping before the student the primary fact that insanity is the result of disease of the brain, that it is not a mere immaterial disorder of the intellect. In the earliest epoch of medicine the corporeal character of insanity was generally admitted, and it was not until the superstitious ignorance of the Middle Ages had obliterated the scientific, though by no means always accurate, deductions of the early writers that any theory of its purely psychical character arose. At the present day it is unnecessary to combat such a theory, as it is universally accepted that the brain is the organ through which mental phenomena are manifested, and therefore that it is impossible to conceive of the existence of an insane mind in a healthy brain. On this basis insanity may be defined as consisting in *morbid conditions of the brain, the results of defective formation or altered nutrition of its substance induced by local or general morbid processes, and characterized especially by non-development, obliteration, impairment, or perversion of one or more of its psychical functions.* Thus insanity is not a simple condition; it comprises a large number of diseased states of the brain, which have been gathered under one popular term on account of mental defect or aberration being the predominant symptom.

The insanities are sharply divided into two great classes—the Congenital and the Acquired. Under the head of Congenital Insanity fall to be considered all cases in which, from whatever cause, brain developement has been arrested, with consequent impotentiality of development of the mental faculties; under that of Acquired Insanity all those in which the brain has been born healthy, but has suffered from morbid processes affecting it primarily, or from diseased states of the general system implicating it secondarily.

In most treatises on the subject will be found discussed the bearing which civilization, nationality, occupation, education, etc., have, or are supposed to have, on the production of insanity. Such discussions are generally eminently unsatisfactory, founded as they are on common observation, broad generalizations, and very imperfect statistics. As they are for the most part negative in result, at the best almost entirely irrelevant to the present purpose, it is proposed merely to shortly summarize the general outcome of what has been arrived at by those authorities who have sought to assess the value to be attached to the influence exercised by such factors, without entering in any detail on the theories involved. (1) *Civilization.*—Although insanity is by no means unknown among savage races, there can be no reasonable doubt that it is much more frequently developed in civilized communities; also that, as the former come under the influence of civilization, the percentage of lunacy is increased. This is in consonance with the observation of disease of whatever nature, and is dependent in the case of insanity on the wear and tear of nerve tissue involved in the struggle for existence, the physically depressing effects of pauperism, and on the abuse of alcoholic stimulants; each of which morbid factors falls to be considered separately as a proximate cause. (2) *Nationality.*—In the face of the imperfect social statistics afforded by most European and American nations, and in their total absence or inaccessibility among the rest of mankind, it is impossible to adduce any trustworthy statement under this head. (3) *Occupation.*—There is nothing to prove that insanity is in any way connected with the prosecution of any trade or profession *per se.* Even if statistics existed (which they do not) showing the proportion of lunatics belonging to different occupations to the 1,000 of the population, it is obvious that no accurate deduction *quoad* the influence of occupation could be drawn. (4) *Education.*—There is no evidence to show that education has any influence over either the production or the prevention of insanity. The general result of discussions on the above subject has been the production of a series of arithmetical statements, which have either a misleading bearing or no bearing at all on the question. In the study of insanity statistics are of slight value from the scientific point of view, and are only valuable in its financial aspects.

Of much greater importance is the question of hereditary predisposition to nervous disease. There is a general and warrantable position taken up by the medical profession, founded on the observation of ages, that a constitutional condition may be generated in a family, which, although it may never manifest itself in a concrete form of disease, may materially influence development, or may make itself felt in a more subtle manner by a mere tendency to degenerative changes. In this wise hereditary predisposition may be regarded as a common factor in all insanities—in the congenital class as an arrester of brain development, in the acquired as the producer of the nervous diathesis. How the constitutional condition is generated, and in what its pathological nature consists, is beyond the ken of science; it may in fact be freely admitted that the proof of its existence hangs more on popular observation than on scientific evidence. The observation is not confined to the nervous system; it extends itself to others, as is shown by hereditary predisposition to gout, consumption, cancer, and other diseases.

It has been strongly asserted that consanguineous marriage is a prolific source of nervous instability. There is considerable diversity of opinion on this subject; the general outcome of the investigations of many careful inquirers appears to be that the offspring of healthy cousins of a healthy stock is not more liable to nervous disease than that of unrelated parents, but that where there is a family history of diathesis of any kind there is a strong tendency in the children of cousins to degeneration, not only in the direction of the original diathesis, but also toward instability of the nervous system. The objection to the marriage of blood relations does not rise from the bare fact of their relationship, but has its ground in the fear of their having similar vitiations in their constitution, which, in their children, are prone to become intensified. There is sufficient evidence adducible to prove that close breeding is productive of degeneration; and when the multiform functions of the nervous system are taken into account, it may almost be assumed not only that it suffers concomitantly with other organs, but that it may also be the first to suffer independently.

Of the other causes affecting the parents which appear to have an influence in engendering a predisposition to insanity in the offspring, the abuse of alcoholic stimulants and opiates, over-exertion of the mental faculties, advanced age, and weak health may be cited. Great stress has been laid on the influence exercised by the first of these conditions, and many extreme statements have been made regarding it. Such must be accepted with reserve, for, although there is reason for attaching considerable weight to the history of ancestral intemperance as a probable causating influence, it has been generally assumed as the proved cause by those who have treated of the subject without reference to other agencies which may have acted in common with it, or quite independently of it. The question has not as yet been fairly worked out. However unsatisfactory from a scientific point of view it may appear, the general statement must stand, that whatever tends to lower the nervous energy of a parent may modify the development of the progeny. It is merely a matter of probabilities in a given case.

Constitutional tendency to nervous instability once established in a family may make itself felt in various directions—epilepsy, hysteria, hypochondriasis, neuralgia, certain forms of paralysis, insanity, eccentricity. It is asserted that exceptional genius in an individual member is a phenomenal indication.

Confined to the question of insanity, this morbid inheritance may manifest itself in two directions—in defective brain organization manifest from birth, or from the age at which its faculties are potential—*i.e.*, congenital insanity; or in the neurotic diathesis, which may be present in a brain to all appearance congenitally perfect, and may present itself merely by a tendency to break down under circumstances which would not affect a person of originally healthy constitution.

In systematic works and in asylum reports, it has been too much the fashion to accept the evidence of the existence of insanity in a relative as a proof of hereditary predisposition in a given case. In estimating the value to be attached to such histories, two things must be taken into account—first, the amount and quality of proved ancestral nervous disease, and, secondly, the period of life at which it appeared in the alleged insane ancestor. Take, for instance, the case of a lunatic whose father or mother is reported to have died insane; this may be true in fact, but may still have no bearing on the causation of the patient's insanity; for the parent may have been the subject of mental disease at a period subsequent to the birth of the child, he may have drunk himself into alcoholic mania late in life, or disease of the cerebral arteries in old age may have produced senile insanity. It is difficult to limit the remoteness of relationship in tracing hereditary predisposition, mainly from the fact that it frequently skips a generation. As a rule it does not confine itself to a single individual of a family, but makes itself felt in one form or another in several members. According to Esquirol and Baillarger, it is more frequently transmitted through the female than through the male branch, but this opinion is called in question by Koch of Würtemberg, whose statistics show that hereditary tendency to insanity acts more strongly through the father than through the mother.

CONGENITAL INSANITY.

The morbid mental conditions which fall to be considered under this head are *Idiocy* (with its modification *Imbecility*) and *Cretinism.*

Idiocy.—In treating of idiocy it must be carefully borne in mind that we are dealing with mental phenomena disassociated from active bodily disease, and that, in whatever degree it may exist, we have to deal with a brain condition fixed by the pathological circumstances under which its possessor came into the world, or by such as had been present before full cerebral activity could be developed, and the symptoms of which are not dependent on the intervention of any subsequent morbid process. From the earliest ages the term *Amentia* has been applied to this condition, in contradistinction to *Dementia*, the mental weakness following on acquired insanity.

The causes of congenital idiocy may be divided into four classes:—(1) hereditary predisposition, (2) constitutional conditions of one or both parents affecting the constitution of the infant, (3) injuries of the infant head prior to or at birth, and (4) injuries or diseases affecting the infant head during infancy. All these classes of causes may act in two directions; they may produce either non-development or abnormal development of cranial bones, as evidenced by microcephalism, or by deformity of the head; or they may induce a more subtle morbid condition of the constituent elements of the brain. As a rule, the pathological process is more easily traceable in the case of the last three classes than in the first. For instance, in the case of constitutional conditions of the parents we may have a history of syphilis, a disease which often leaves its traces on the bones of the skull; and in the third case congenital malformation of the brain may be produced by mechanical causes acting on the child in utero, such as attempts to procure abortion, and deformities of the maternal pelvis rendering labor difficult and instrumental interference necessary. In such cases the bones of the skull may be injured; it is only fair, however, to say that more brains are saved than injured by instrumental interference. With regard to the fourth class, it is evident that the term congenital is not strictly applicable; but, as the period of life implicated is that prior to the potentiality of the manifestation of the intellectual powers, and as the result is identical with that of the other classes of causes, it is warrantable to connect it with them, on pathological principles more than as a mere matter of convenience.

Dr. Ireland, in his work *On Idiocy and Imbecility*, classifies idiots from the standpoint of pathology as follows: (1) Genetous idiocy; in this form, which he holds to be complete before birth, he believes the presumption of heredity to be stronger than in other forms; the vitality of the general system is stated to be lower than normal, the palate is vaulted and narrow, the teeth misshapen, wrongly placed and prone to decay, and the patient dwarfish in appearance; the head is generally unsymmetrical, and the commissures occasionally atrophied; (2) Microcephalic idiocy, a term which explains itself; (3) Eclampsic idiocy, due to the effects of infantile convulsions; (4) Epileptic idiocy; (5) Hydrocephalic idiocy, due to water on the brain; (6) Paralytic idiocy, a rare form, due to the brain injury causing the paralysis; (7) Traumatic idiocy, a form produced by the third class of causes above mentioned; (8) Inflammatory idiocy; (9) Idiocy by deprivation of one or more of the special senses.

The general conformation of the idiot is often very imperfect; he is sometimes deformed, but more frequently the frame is merely awkwardly put together, and he is generally of short stature. Only about one-fourth of all idiots have heads smaller than common. Many cases are on record in which the cranial measurements exceed the average. It is the irregularity of development of the bones of the skull, especially at the base, which marks the condition. Cases, however, often present themselves in which the skull is perfect in form and size. In such the mischief has begun in the brain matter. The palate is very often highly arched, in some cleft; hare-lip is not uncommon; in fact congenital defect or malformation of other organs than the brain is more commonly met with among idiots than in the general community. Of the special senses, hearing is most frequently absent. Sight is good, although coördination may be defective. Many are mute. On account of the mental dullness it is difficult to determine whether the senses of touch, taste and smell suffer impairment; but the impression is that their acuteness is below the average. It is needless to attempt a description of the mental phenomena of idiots, which range between utter want of intelligence and mere weakness of intellect.

The treatment of idiocy and imbecility consists almost entirely of attention to hygiene, and the building up of the enfeebled constitution, along with endeavors to develop what small amount of faculty exists by patiently applied educational influences. The success which has attended this line of treatment in many of our public and private institutions has been very considerable. It may be safely stated that all idiotic or imbecile children have a far better chance of amelioration in asylums devoted to them than by any amount of care and teaching lavished upon them at home.

In the class of idiots just spoken of imperfect development of the intellectual faculties is the prominent feature—so prominent that it masks the arrest of potentiality of development of the moral sense, the absence of which, even if noticed, is regarded as relatively unimportant; but in conducting the practical study of congenital idiots, a class presents itself in which the moral sense is wanting or deficient, while the intellectual powers are apparently up to the average. It is the custom of writers on the subject to speak of "intellectual" and "moral" idiots. The terms are convenient for clinical purposes, but the two conditions cannot be disassociated, and the terms therefore severally only imply a specially marked deprivation of intellect or moral sense in a given case. The everyday observer has no difficulty in recognizing as a fact that deficiency in receptive capacity is evidence of imperfect cerebral development; but it is not so patent to him that the perception of right and wrong can be compromised through the same cause, or to comprehend that loss of moral sense may result from disease. The same difficulty does not present itself to the pathologist; for, in the case of a child born under circumstances adverse to brain development, and in whom no process of education can develop an appreciation of what is right or wrong, although the intellectual faculties appear to be but slightly blunted or not blunted at all, he cannot avoid connecting the psychical peculiarity with the pathological evidence. The world is apt enough to refer any fault in intellectual development, manifested by imperfect receptivity, to a definite physical cause, and is willing to base opinion on comparatively slight data; but it is not so ready to accept the theory of a pathological implication of the intellectual attributes concerned in the perception of the difference between right and wrong. Were, however, two cases pitted one against another—the first, one of so-called intellectual, the second, one of so-called moral, idiocy—it would be found that, except as regards the psychical manifestations, the cases might be identical. In both there might be a family history of tendency to degeneration of the nervous system, a peculiar cranial conformation, a history of nervous symptoms during infancy, and of a series of indications of mental incapacities during adolescence, differing only in this, that in the first the prominent indication of mental weakness was inablity to add two and two together, in the second the prominent feature was incapacity to distinguish right from wrong. What complicates the question of moral idiocy is, that many of its subjects can, when an abstract proposition is placed before them, answer according to the dictates of morality, which they may have learnt by memory. If asked whether it is right or wrong to lie or steal they will say it is wrong; still, when they themselves are detected in either offense, there is an evident non-recognition of its concrete nature. The question of moral idiocy will always be a moot one between the casuist and the pathologist; but, when the whole natural history of such cases is compared, there are points of differentiation between them and mere moral depravity which must appeal to even biased observers. Family history, individual peculiarities, the manifest imbecility of the acts committed, the general bizarre nature of the phenomena, remove such cases from the ordinary category of crime.

Cretinism.—Crétin probably comes from *Chrétien*, either from the idea that the person was innocent in the sense in which that word is employed occasionally to imply a person who cannot sin, or from the religious respect in which cretins were held. Cretinism is a form of congenital insanity inasmuch as the cretino genetic miasma acts before birth; it is endemic in many mountainous countries, and is said to occur most frequently on magnesian limestone formations, but never at an elevation above 3,000 feet. Although all cretins have not goitre, and all goitrous persons are not cretins, there is a very intimate relationship between the two conditions. The districts in Europe in which it is most common are the departments of Hautes-Pyrénées, Haute-Savoie, and Hautes-Alps; Styria, Upper Austria, the province of Aosta, and Sardinia. It is found more sparsely in other parts of Europe, and also among the Himalayas and Andes. It occasionally presents itself in flat countries—a remarkable instance being the island of Niederwerth below Coblentz, where out of 750 inhabitants there are 131 cretins. Notwithstanding the circumscribed area in which this disease exists, affording, it might be supposed, data founded on the conditions of life common to their inhabitants for arriving at conclusions as to its cause, nothing has been definitely determined. Cretinism has occupied the attention of many eminent observers, but the various theories they have advanced have been in succession overturned. It has been suggested that the condition is due to the constant use of snow-water, or to the presence of sulphate of iron or of lime in water, but none of these theories admit of universal application. That the disease is due to some geological or climatic cause appears certain from the fact, stated by Baillarger, that it disappears from a family in one or two generations after removal to a healthy climate, and may even be prevented by the gravid mother leaving a valley where it is rife for localities where cretinism is unknown. The physical and mental symptoms of cretinism are so closely allied in essentials to those of congenital idiocy as not to demand a separate description. The marked features of the disease are its endemic nature and its intimate connection with goitre. (See CRETINISM.)

ACQUIRED INSANITY.

Pathology.

It is predicated in treating of Acquired Insanity that we have to deal with brains congenitally perfect, the exercise of whose functions has been normal until the incidence of disease. The purely nervous structures of the brain consist of very delicate fibers and cells, the latter occurring only in the gray matter. It is richly supplied with blood vessels, the supply being six times greater to the gray matter than to the white. These tissues are supported and separated one from the other by a connective tissue, or interstitial matter, the *neuroglia;* the whole organ is enveloped in membranes which separate it from the skull. By one system of independent fibers (the expansion system) communication is maintained between the spinal cord, the central ganglia, and the cortical gray matter; by a second system of fibers (the commissural), corresponding and identical regions of the gray matter of the two opposite hemispheres are united; and by a third system (the horizontal) communication is maintained between the parts of the same hemisphere. The cells communicate one with the other by means of processes or poles, fine projections from the body of the cell. The observations of Cleland and Boll show that the apical processes become connected with the fibers as they go to the periphery; the basal processes loop with the horizontal fibers, and also, by means of their recurrent poles, with those of the expansion series. But it is of great importance to observe that we have no evidence of fiber communicating directly with fiber, or no certain proof that one series of fibers communicates directly with others; in fact, all anatomical demonstration goes to prove the individuality and isolation of fiber, the processes of the cell being the connecting link. It is universally accepted that the cerebral cells possess the vital property of generating, receiving, and transmitting nervous influences, and that the fibers are the organs by means of which these influences are received and communicated. The term *mind* may be applied to the combination of all the actual and possible states of consciousness of the organism. We have a right to presuppose that in the brain, as in other organs of the body, the normal exercise of function is dependent on a perfect maintenance of the anatomical relations of the component structures, and conversely that morbid conditions of these structures must affect the whole economy more or less seriously. In studying brain pathology it must be kept in view that the brain cannot, like the lungs, liver, and kidneys, cast any of its functions on other organs; it must do its own work, rid itself of effete matter, and of the products of injury or disease, and provide within itself for the resumption of functions, the exercise of which has become impaired from whatever cause.

Solutions of continuity, preventing perfect maintenance of the component cerebral tissues, may arise from—(1) idiopathic causes, *i.e.*, causes originating primarily in the brain; (2) traumatic causes (injury to the head); (3) the effects of other neuroses (morbid nerve conditions); (4) adventitious products (tumors, etc.); (5) morbid conditions of the general system secondarily implicating the brain; (6) evolutional conditions of the system concurrently affecting the brain; (7) toxic agents (poisons). In the case of insanity the results of morbid action are confined to the convolutions of the superior surface of the brain, and to the upper part of its lateral aspects: for the most part its base and inferior lateral aspects and the cerebellum are unaffected. It is true that in old standing cases the central ganglia present lesions, but these are for the most part secondary, and are due to the action of disease in the superior convolutions.

1. Idiopathic changes occur from disease affecting the tissues, the cause of which it may be impossible to trace,—as, for instance, acute inflammation, which, however, is not a frequent cause of insanity. Diffused subacute inflammation is held to be a much more fruitful cause, producing increase (sclerosis) of the neuroglia, degeneration of the cells, destruction (atrophy) and displacement of fibers, and aneurism, distortion, and obliteration of vessels.

A large and important class of causes of idiopathic morbid action is due to over-excitation of the brain. The causes of over-excitation of the brain functions are those which, in most works on insanity, are spoken of as "moral" (grief, anxiety, domestic complications, disappointment, terror, sorrow or joy, religious or political excitement, the exercise of the mental faculties by study unduly prolonged or conducted under adverse circumstances) in contradistinction to "physical" causes —a distinction which implies some material difference in their method of operation. To the most superficial observer, the deformed head of the idiot, and the paralysis of mind and body which follows on the rupture of a cerebral vessel, are coarsely material conditions; but when mental aberration follows on mental excitement, men are prone to regard it more as a derangement of function than as an evidence of deterioration of brain structure. If, however, we give due weight to the results of physiological research, the matter is not quite so obscure. Arguing from the analogies of other organs and from direct observation, there is reason to believe that when the brain functions are being actively exerted there is a dilatation of the vessels and an increased blood supply (hyperæmia) to its superior and lateral surfaces. This functional hyperæmia is caused by the direct action of the cerebral cells, which, along with the sympathetic system of nerves, exercise control over the muscular coats of the arteries, the immediate regulators of blood supply to any given part. Control over muscular tissue implies, of course, control in two directions, dilatation and contraction. Functional hyperæmia is in every respect a healthy condition, one necessary for the provision of temporary nutriment during temporary action, ceasing with the withdrawal of stimulus, when the caliber of the vessels is reduced to its original dimensions through the contracting influence of the cells. But if the excitement is unduly prolonged a new result appears; the cells themselves become exhausted, and therefore, even if the stimulus is withdrawn, they are unable to assert their ordinary control over the arterial muscular coats in the direction of contraction, so that the increased blood supply continues although the stimulus which caused it has been removed. Instead of functional hyperæmia we have a hyperæmia caused, not by functional excitement, but by exhaustion of the controlling organs. In a minor degree the results of this condition are matters of everyday observation; overtaxation of the brain functions, by study for instance, is very generally followed by sensations of fullness and aching of the head, loss of sleep, and general exhaustion—a condition which is recovered from when the primary irritation is withdrawn, *i.e.*, when the arteries reacquire healthy tone. But if relief from the causes of irritation is not obtained, a sequence of events ensues tending to deterioration of tissue. In the first place, sleep, the condition necessary for rest and recuperation of the cells, becomes unattainable. Physiological research has shown that during sleep the supply of blood to the brain is diminished (anæmia), that anæmia is necessary for, and hyperæmia is inimical to, its production. Further deterioration of cell activity follows on non-recuperation, and concomitant diminished control over the vessels tends to the establishment of morbid hyperæmia and more or less blood stagnation (stasis).

By this exposition of a probable sequence of pathological events it is desired to indicate that disturbance of function directly referable to over-excitation of the brain is not a mere functional derangement, not a mere morbid increase of a normal emotion, but that it is the manifestation of a pathological condition—that, in effect, so-called moral causes may be the producers of physical cerebral disease. This meets with support from the clinical observation that, with very rare exceptions, a considerable period of time elapses between the incidence of the moral cause and the first indication of mental alienation—an interval during which sleep has been absent in consequence of continued hyperæmia. Instances of melancholy or mania being suddenly produced by mental shock must be searched for in works of fiction. Sudden fright, more especially, is stated to produce immediate convulsion, epilepsy, and catalepsy, but not insanity; except in certain comparatively rare instances, in which it appears to induce with great rapidity a cataleptic mental state, presently to be spoken of as acute primary dementia. Over-exercise of the intellectual function is not by any means such a prolific cause of brain disease as undue emotion. It is not work but worry that kills the brain. When both are combined the result is often rapid.

On the removal or persistence of congestion depends the issue of a case—recovery, or further and permanent solution of continuity. Unless relief is soon obtained, the changes in the cells are followed by lesions of other brain structures which are productive of important pathological conditions affecting the general system; these in their turn render recovery more difficult or impossible, or may even cause death.

2. The second class comprises all accidents and injuries affecting the brain, and is most conveniently termed *traumatic*. Violence to the head may produce fracture of the skull, with or without depression, extravasation of blood in or on the brain, or concussion. There is no relation between the apparent extent of the injury and the results of insanity; extensive fractures of the frontal, lateral, and superior surfaces of the skull, even when complicated with rupture of the envelopes and loss of brain matter, are not, taken over all, more productive of insanity, if so much so, as the apparently less serious condition of concussion. The reason of this is not far to seek; by the open wound free egress is afforded for extravasated blood and the products of inflammation, whereas in concussion, which may also involve extravasation of blood in or on the brain, foreign substances have no means of escape, and so may set up morbid action of a grave nature. Occasionally insanity follows rapidly on the injury, but much more frequently weeks or even months elapse before development of mental symptoms amounting to insanity. During this period morbid action is proceeding on the inner surface of the skull, in the membranes, or in the brain itself. On the inner table of the skull bony growths may be in process of formation, subacute inflammation of the membranes may be going on, and from the same cause the brain may be undergoing progressive changes generally in the direction of sclerosis, *i.e.*, increase of connective tissue.

3. The nervous diseases in the train of which insanity occasionally follows are Epilepsy, Hysteria, and Locomotor Ataxy. In the case of Epilepsy the brain lesions are doubtless the result of the frequently asphyxiated condition of the patient and of the blood poisoning due to the retention of carbonic acid gas. As might be expected, lesions of the arteries in the form of hypertrophy of their coats is frequently observed. The canals in the brain matter through which the vessels pass are very frequently found dilated to from two to six times their normal dimensions. If the richness of the blood supply to the gray matter is considered, this condition of dilatation must imply an immense loss of brain tissue; moreover, the cells are frequently found suffering degeneration. In dealing with the subject of hysteria, we have to do with a disease which, although marked by very prominent symptoms, possesses no anatomical seat, and thus when the disease amounts to insanity we are equally in the dark as to the cerebral conditions. The insanity following or accompanying hysteria is not a fatal one in its earlier stages, and there is no report extant of an autopsy on a recent case of this disease. Locomotor Ataxy is a disease of the spinal cord, sclerosis of its posterior columns. It implicates other parts of the nervous system—for instance, the optic tracts and nerves. Insanity occasionally is concurrent with, and probably, if not certainly, is produced by, an extension of the sclerosis to the cerebal convolutions. This theory meets support from the fact that the mental symptoms associated with locomotor ataxy resemble very closely those of general paralysis, in which hypertrophy of the connective tissue of the superior convolutions has been demonstrated.

4. By the term adventitious products it is meant to indicate all forms of tumors of the brain, skull-cap, and membranes. Such foreign bodies have three distinct effects on the brain structure:—"1st, They create an irritation tending to ramollissement in the nerve substance, with which they are in contact from their first appearance. 2d, They cause pressure on distant parts, which in its turn causes an alteration of the structure and nutrition. 3d, They set up progressive disease and degeneration of certain parts of the nerve structure, the true nature of which is as yet not very well known; but it seems to be in some way directly connected with the essential nature and constitution of all sorts of nerve substance, whether cells or fibers. Its results pathologically are an increase of the connective tissue in the form of granules, and enlargement and thickening of the coats of the blood-vessels; but all these seem to be secondary changes." Apoplectic clots are practically tumors.

5. Morbid conditions of the general system secondarily implicating the brain. It is of great interest from an etiological point of view to note that insanity is seldom if ever the immediate result of diseases of individual organs, but that it is more or less intimately associated with those forms of disease which result from a general constitutional instability, such as tuberculosis, rheumatism, gout, and syphilis. There are many diseases painful in character and very depressing to the nervous system, such as stone, fistula (in fact all the so-called surgical diseases of the rectum and bladder), cancer of the uterus, etc., which might be presupposed to be probable causes of insanity, yet in point of fact are not inimical to mental health. They may be so indirectly, inasmuch as they prevent sleep, but even in this wise their effect is very slight. Nor does there appear sufficient reason to connect diseases of the heart, liver, kidneys, directly with insanity. Much stress has been laid on diseases of the uterus and ovaries, and more especially on tumors of these organs, being the primary factors in the production of insanity. But authors on gynæcology make no mention of insanity being a sequela of uterine disease, except in so far as the mental depression which in most women follows on the knowl-

edge that they are affected by serious, perhaps fatal, disease, and the pain and anxiety inseparable therefrom, may produce sleeplessness, and consequent melancholy; and there is no proof of such tumors exercising an extensive influence on causation by peripheral irritation. The fallacy has in the great majority of instances probably arisen from the observation often made in asylums that insanity arising from whatever cause is conditioned by the presence of uterine growths, and that delusions of a sexual character may arise from the sensations thereby produced. Of the very few instances on record in which a direct connection between uterine disease and insanity has been traced may be cited a case reported by Van der Kolk, in which deep melancholy and prolapsus uteri coëxisted; the mental symptoms were at once relieved by the organ being restored to its normal position. Such cases are very rare. Excessive sexual indulgence is frequently alleged as a cause of insanity in man. Admitting the truth of the position taken, the result is but the product of nerve complications and it is extremely to be doubted that any purely mental (or moral) consideration is to be taken into account. Undoubted cases of insanity arise from unnatural gratification of the sexual appetite (masturbation). Here we have to deal not only with the physical effect of nervous disturbance and depletion of the nutritive elements of the blood, caused by excessive expenditure of the seminal fluid, but also with the mental effect of delusions frequently indulged. To explain our position: During the act of masturbation, the subject invariably as a result of his sexual excitement fixes his mind on some one of the opposite sex, and in his imagination is performing the sexual act with the object of his thoughts. As he approaches the climax of his excitement the delusion becomes more and more vivid. It follows that these delusions being frequently indulged in will acquire more and more intensity until the subject is unable to discriminate between *reality* and *delusions*. Nor does the delusion end with sexual subjects; it gradually extends to other matters, and the victim of self-abuse is unable to discriminate between the real and the imaginary in the common affairs of life—in other words, is insane. Taken *time for time*, we believe that masturbation (save the difference of moral effect) is no more harmful than sexual intercourse. Its great evil is in the frequent opportunities one has for its indulgence —thereby leading to excess.

It is still a moot point whether a true tubercular or phthisical insanity exists; if it does, it certainly does not arise from tubercular deposits in the brain—a very rare condition in the insane. Those authorities who deny the existence of phthisical insanity hold that, although mental symptoms do frequently present themselves in cases of consumption, and although consumption is very frequent among the insane, the insanity is not directly dependent on the diathesis, but more probably results from the general lowering of the system, and at most is only conditioned by the primary disease. In the case of rheumatism and gout there are strong reasons for believing that an actual translation (metastasis) of the *materies morbi* occasionally takes place from affected joints to the connective tissue of the brain and cord—the evidence being choreic movements of the limbs, St. Vitus' Dance) accompanied by acute mental symptoms, both of which disappear contemporaneously with the return of inflammatory swellings of the joints. Syphilis may act on the brain by the production of tumors (which, however, do not differ in their effects from those of other adventitious products), and by specific changes in the coats of the arteries, which become thickened and even occluded. As a consequence the tissues in their neighborhood suffer deterioration.

The pathological relation between sun-stroke (insolation) and brain disease has not been ascertained. A certain amount of brain congestion has been observed, but not invariably. The cerebral lesion is more probably due to the extreme depression of the whole nervous system; but the *modus operandi* is unknown.

The morbid condition of the general system which most frequently implicates the brain is anæmia, not itself a disease, but the result of many diseases, such as fever, and of such drains on the constitution as lactation (suckling) and imperfect nourishment. The operativeness of these drains may be assisted by overwork under unhealthy conditions. As a typical example may be cited the dressmaker, poorly paid, poorly fed, working for many hours daily in an ill-ventilated room, and sleeping in an unhealthy garret. The term anæmia is not used here to indicate a condition antithetical to hyperæmia—it does not imply any mechanical deprivation of blood supply; on the contrary, the amount of blood, such as it is, is not reduced in quantity. The temporary mechanical anæmia which results from extreme cold produces its effects rapidly—short delirium and profound sleep. But it is qualitative anæmia, an impoverished state of the blood, which produces more or less permanent results on cerebral health. Inanition acts rapidly on the brain: in the case of those cast away at sea on rafts or in boats the general story is that of short delirious mania, suicide, or death from nervous exhaustion, before emaciation (*i.e.*, before the reserve food of the system is consumed) takes place. So in cases where inanition is more slowly produced, the nervous system is first depressed. And here the position becomes somewhat complicated; for not only is, under such circumstances, the relative amount of the blood constituents different from the normal standard, but its corpuscular elements changed in quality; they acquire a degree of viscidity which tends to cause the red corpuscles to coalesce and hang together, and the white to lag and wander into surrounding tissue; and further, this unphysiological behavior of the corpuscles is apt to become aggravated in regions whose nervous energy is depressed. Anæmia thus acts and reacts in procuring a condition of stasis.

6. The effects of evolutional periods concurrently affecting the brain; puberty, adolescence, utero-gestation, the climacteric period, and old age. Although from the time when the human being comes into the world to the final cessation of his corporeal existence the various functional operations of organic life are carried on with ceaseless activity, while those of animal life are only suspended by the intervals of repose which are needed for the renovation of their organs, yet there are very marked differences, not only in the *degree of their united activity*, but also in the *relative degrees of energy which they severally manifest* at different epochs. These differences in degree imply physiological modifications of nutrition, and the observation of ages has caused it to be accepted as a fact in the etiology of disease that numerous and various degenerations occur contemporaneously with such modifications, more especially in the subjects of diathetic conditions. The development of phthisis during adolescence, and of cancer among persons at the climacteric period, may be cited as instances. It may be freely admitted that the nexus between the physiological and the pathological position is, as regards certain of the periods, obscure, and that it is dependent more on induction than on demonstration; but it may be pleaded that it is not more obscure in respect of insanity than of other diseases. The pathological difficulty obtains mostly in the relation of the earlier evolutional periods, puberty and adolescence, to insanity; in the others a physiologico-

pathological nexus may be traced; but in regard to the former there is nothing to take hold of except the purely physiological process of development of the sexual function, the expansion of the intellectual powers, and rapid increase of the bulk of the body. Although in thoroughly stable subjects due provision is made for these evolutional processes, it is not difficult to conceive that in the nervously unstable a considerable risk is run by the brain in consequence of the strain laid on it. Other adjuvant influences may be at work tending to excite the system which will be spoken of when the insanity occurring at these periods is described. Between the adolescent and climacteric periods the constitution of the nervous, as of the other systems, becomes established, and disturbance is not liable to occur, except from some accidental circumstance apart from evolution. In the most healthily constituted individuals the "change of life" expresses itself by some loss of vigor. The nourishing (trophesial) function becomes less active, and either various degrees of wasting occur, or there is a tendency toward restitution in bulk of tissues by a less highly organized material. The most important instance of the latter tendency is fatty degeneration of muscle, to which the muscle of the arterial system is very liable. In the mass of mankind those changes assume no pathological importance; the man or woman of middle life passes into advanced age without serious constitutional disturbance; on the other hand, there may be a breakdown of the system due to climacteric disease of special organs, as, for instance, fatty degeneration of the heart. In all probability the insanity of the climacteric period may be referred to two pathological conditions; it may depend on structural changes in the brain due to fatty degeneration of its arteries and cells, or it may be a secondary result of general systemic disturbance, due to cessation of menstruation in the female, and, possibly, to some analogous modification of the sexual function in men. The senile period brings with it further reduction of formative activity; all the tissues waste, and are liable to fatty and calcareous degeneration. Here again the arteries of the brain are very generally implicated; atheroma in some degree is almost always present, but is by no means always followed by insanity. Whewell retained his faculties to the last, notwithstanding that his cerebral arteries were much diseased. Still this condition must be taken into account in studying the causation of senile insanity, as it necessarily implicates the nutrition of the brain. It must assist in preventing recuperation of the cells; it may in certain instances diminish suddenly the blood supply to a particular area; but the stronger probability is that the senile mental decay lies at the door of senile degeneration of the cells.

The various and profound modifications of the system which attend the periods of utero-gestation, pregnancy, and child-bearing do not leave the nervous centers unaffected. Most women are liable to slight changes of disposition and temper, morbid longings, strange likes and dislikes during pregnancy, more especially during the earlier months; but these are universally accepted as accompaniments of the condition not involving any doubt as to sanity. But there are various factors at work in the system during pregnancy which have grave influence on the nervous system, more especially in those hereditarily predisposed, and in those gravid for the first time. There is modification of direction of the blood toward a new focus, and its quality is changed, as is shown by an increase of fibrin and water and a decrease of albumen. How much these changes structurally affect the encephalon may be deduced from the fact of the presence of bony plates (osteophyte) on the surface of the dura mater and the inner table of the skull, and how much functionally, by constant congestions and flushings. To such physical influences are superadded the discomfort and uneasiness of the situation, mental anxiety and anticipation of danger, and in the unmarried the horror of disgrace. In the puerperal (recently delivered) woman there are to be taken into pathological account the various depressing influences of child-bed, its various accidents reducing vitality, the sudden return to ordinary physiological conditions, the cessation of the occasional physiological condition, the rapid call for a new focus of nutrition, the translation, as it were, of the blood supply from the uterus of the mammæ—all physical influences liable to affect the brain. These influences may act independently of moral shock; but, where this is coincident, there is a condition of the nervous system unprepared to resist, or, it may rather be said, prepared to succumb.

7. Among the toxic agents which affect the brain, alcohol holds the foremost place. On the action of this poison the article DRUNKENNESS supplies full information. Considerable difficulty exists as to the estimation of the importance to be attached to alcohol in the production of brain disease from the fact that excess in the use of stimulants is very frequently a symptom of incipient insanity, and that the symptom is often mistaken for the cause. The habitual use of opium and Indian hemp (*Cannabis indica*), which first stimulate and then paralyze the action of the cerebral cells, is a frequent cause of lesion.

Difficulties may arise in individual cases in establishing a theory of causation from the presence of what are generally spoken of in systematic works on insanity as "mixed" causes, *i.e.*, the presence of two morbid factors in one individual. So long as these consist in variety in character of excited psychical action, such as grief and anxiety of business, over-prolonged study and domestic affliction, the combination does not affect the position; but when we have the history of one or more such psychical influences being associated with a depraved condition of the general system, with poverty, with excess in alcoholic stimulants, or with hereditary predisposition, it appears at the first glance difficult to assess the value to be attached to each in the production of brain disease. This complication is, however, more apparent than real; weakness of the system, whether produced by disease or by malnutrition, only implies a condition in which cerebral degeneration is more likely to occur, but where there is no reason to believe it would have occurred if the brain, weakened along with the other organs of the body, had not been subjected to over-excitation. It may be argued that the brain excitation would not have produced the lesion if the tone of the general system had not been lowered; that is as may be—it is a proposition which cannot be accepted or denied positively in the absence of positive data. But negative data obtain which warrant its refusal. These are twofold:—a depraved condition of the general system is a frequent result of over-excitation of the brain, the result being liable to be mistaken for the efficient cause; and the history and symptoms of insanity resulting from special morbid conditions of the system differ materially from those produced by over-excitation.

The action of all these varied morbid factors is in the direction of solution of continuity of cerebral elements, and consequently of perversion of psychical function. And here a wide gap opens itself in the study of brain pathology in its relation to morbid psychology. No adequate theory has been advanced to account for the sequence of a particular type or train of morbid mental symptoms on a particular morbid condition of the brain. In the most definite forms of insanity, those of which the morbid anatomy is pretty definitely determined, there is not the slightest suggestion afforded of the causation of the peculiar type of mental symptoms which symptomatize them, or for the alternation of symptoms in an individual case, or for diversity of symptoms apparently starting from the same cause. All that is known is that when the hemispherical ganglia are diseased we may have excitement or depression of feeling, delusion, or obfuscation of the intellectual and moral qualities; but why in one case excitement, in another delusion, and in a third both, is an utter mystery.

Classification.

The mental symptoms of acquired insanity have been classified from the time of Pinel—it might, save from some slight difference in the application of the terms, be said from the time of Hippocrates—as mania, melancholia, and dementia, according as exaltation or depression of feeling or weakness of intellect presents itself most prominently in a given case. Pritchard asserted that mental symptoms were divisible into two great classes, according as the intellectual and moral faculties were implicated. This principle falls to the ground from the simple but most important fact, that the primary symptom in all insanities is perversion of the moral sense, and that this perversion pervades all cases of mental disease to their termination. This change of morale amounts to various degrees of perversion of the ordinary character and disposition of the individual. He becomes indifferent to social considerations, apathetic and neglectful of the personal and family duties, evinces dislike and suspicion of friends and relatives, and may betake himself to excess in alcoholic stimulants and other forms of dissipation. There is a general concentration of his ideas on himself, which is often spoken of as the selfishness of the insane. According to the direction in action in which perversion of the moral sense is manifested such so-called forms of insanity have been constructed as dipsomania, kleptomania, erotomania, etc., which, however, are to be regarded as merely accidental phenomena. Moral insanity may appear to exist alone at certain times in certain cases, but it is greatly to be doubted, whether it really ever exists apart from intellectual perversion. The mere fact that a person cannot appreciate the change in himself, cannot, as it were, disapprove of his own actions, is evidence that the moral faculties are not alone implicated. The converse proposition may be stated even more strongly—intellectual insanity never exists without moral perversion.

Moral perversion is, however, only one of the initial symptoms. In most insanities a " period of incubation " is observed, generally spoken of as the prodromal or initial period. Sudden and violent outbursts of insanity are occasionally reported, but, when these are carefully examined into, a train of prodromal symptoms, physical as well as psychical, can almost invariably be traced. These symptoms are for the most part insidious in character. Founding on the statements of patients suffering from premonitory symptoms, on those made by others, who, having recovered, are able to carry back their recollection to the incidence of the prodromal stage, and on the direct observation of the physician, physical indications are the first to present themselves. These consist in a feeling of fullness in the head, throbbing of the forehead and eyeballs, flashes of light before the eyes, and general malaise. The mental symptoms follow closely, and consist, in addition to the change in morale already spoken of, in restlessness, irritability, inability to apply the mind to the everyday affairs of life, and sleeplessness. In certain forms this description of the prodromal symptoms requires some slight modification. They are very generally accompanied by impairment of general health.

When Esquirol's definition of the mental conditions is quoted, little more need be added, for further description would merely involve an amplified account of psychological peculiarities. Esquirol thus describes the conditions:—(1) Melancholia, or, as he terms it, Lypemania, disorder of the faculties with respect to one or a small number of objects, with predominance of a sorrowful and depressing passion; (2) Monomania, in which the disorder of the faculties is limited to one or a small number of objects, with excitement, and predominance of a gay and expansive passion; (3) Mania, in which the insanity extends to all kinds of objects, and is accompanied by excitement; (4) Dementia, in which the insensate utter folly, because the organs of thought have lost their energy and the strength requisite for their functions. In 1852 Schroeder van der Kolk and in 1860 Morel laid the foundation of a classification more in accordance with pathological science. The former included the different forms of the disease under two great classes:—"idiopathic insanity," comprising all cases produced by primary affections of the brain; and "sympathetic insanity," including those due to morbid conditions of the general system. Morel divided the insanities into six groups:—(1) hereditary insanity; (2) toxic insanity; (3) insanity produced by the transformation of other diseases; (4) idiopathic insanity; (5) sympathetic insanity; (6) dementia, a terminative stage. Notwithstanding faults of detail, it may be fairly said that these propositions marked a great advance in the study of insanity, and that all later classifications based on the same principles have been derived from study of them. The following system admittedly is so:

I. Idiopathic insanities.	Idiopathic mania, melancholia, and dementia. General paralysis of the insane.
II. Traumatic insanity.	
III. The insanities associated with other neuroses.	Epileptic insanity. Hysterical insanity. Hypochondriacal insanity.
IV. Insanity resulting from the presence of adventitious products.	
V. Insanities resulting from morbid conditions of the general system.	Phthisical insanity. Rheumatic insanity. Gouty insanity. Syphilitic insanity. Insanity from sunstroke. Anæmic insanity.
VI. Insanities occurring at evolutional periods.	Insanity of pubescence and adolescence. Climacteric insanity. Senile insanity. Insanity of pregnancy. Puerperal insanity.
VII. Toxic insanity.	

I. Idiopathic Mania and Melancholia.—It is proposed to consider under the head of Idiopathic mania and melancholia the large and important class of cases which result from over-excitation of the brain, due to so-called moral causes. In considering this form of insanity, a difficulty arises in reconciling the dependence of two such apparently widely divergent morbid psychical states as mania and melancholia on one common pathological condition. That they are so is maintained by the following clinical observation: 1st, that during the prodromal period, *i.e.*, the period during which over-excitation is using its influence on the brain tissues, the symptoms of excitement and depression generally alternate; 2d, that in certain acute cases mania and melancholia coexist, that is to say, it is impossible for the observer to say whether they are cases of maniacal melancholia or melancholic mania; 3d, that, as many cases run their course toward recovery, the symptoms are consecutively mania, melancholia, and dementia; 4th, that the effects of irritating poisons applied to the brain, alcohol markedly, produce these symptoms in some individuals in a very short space of time. These observations point, not to a difference of pathological causation, but to variation in symptoms in conformity with the progress of pathological processes. It must be borne in mind that congestion is not a condition constant in quality or in quantity, and, further, that it is an inconstant condition acting on an inconstant subject, and therefore productive of cumulative, inconstant results. Brain congestion, due to over-excitation, produces functional excitement of that organ. It must be remembered that although mania is accompanied by exaltation, and melancholia by depression of feeling, they are both manifestations of excitement of feeling. Given this common psychological condition of excitement, a reason must be sought for the variety of its manifestation either in some peculiarity of the irritating cause or in some idiosyncracy of the affected individual. In either case no material assistance is gained from psychological considerations, for there is no necessary connection between depressing emotions and melancholia; intense grief often produces acute mania, and the insanity of the man of saturnine mind is as often as not characterized by mania. The peculiarity of the irritating cause appears to be, not its psychological characteristic, but its intensity. The more rapidly excitement of feeling is produced, the more likely is mania to be the symptom of the insanity. That melancholia often supervenes on depressing emotions gradual in their incidence does not imply a psychological nexus, but that, as their irritating influence is slowly applied, so the results of the irritation are slowly produced, and (as in the case of every tissue of the body) there is variety of degree of symptoms in conformity with the rapidity of the progress of pathological events. There are also various underlying conditions difficult to treat of in the mass, any one of which may have considerable bearing on an individual case. Constitutional predisposition (diathesis) may render a person more prone to the sub-acute forms of disease, and the condition of the body at the time of irritation may influence the nature of the symptoms in either direction. In the absence of the possibility of applying to the brain the mechanical aids which have given the physician an insight into the sequence of pathological events occurring in other organs, the pathologist has nothing to depend on save clinical observation. He has presented to him a diseased organ, complex in function, of the physiology of which he is, as regards its psychical action, profoundly ignorant: all he can say is that, when its histological integrity is impaired, he has reason to believe that "some functions become torpid and oppressed, while others are excited into preternatural activity" (Bucknill and Tuke). It must be stated, however, that in a considerable proportion of cases the nature of the ultimate condition is foreshadowed from the very commencement by the character of the initial symptoms. Simple depression of feeling may be the first and last symptom of insanity, or it may gradually increase in intensity till it attains the extreme and most complicated form of melancholia. In like manner simple excitement and exaltation of feeling may characterize a case from beginning to end, or it may culminate more or less rapidly in active mania, without the intervention of other psychical symptoms.

As to the duration of the prodromal period, in the mass of cases nothing can be stated with certainty; it can only be said that, as a general rule, the incidence of melancholia is more slow than that of mania. Putting aside exceptional cases, it may be stated that, whereas the former is a matter of months or weeks, the latter is a matter of weeks or days.

The initial mental symptoms having been already described, it remains only to say that the general system becomes coincidentally affected; functional disturbances of the digestive organs soon manifest themselves, and the nutrition of the body becomes defective. To this implication of other systems consequent on impairment of the trophesial (nourishment-regulating) function of the brain can be traced a large amount of the errors which exist as to the causation of idiopathic melancholia and mania. Very frequently this secondary condition is set down as the primary cause; the insanity is referred to derangements of the stomach or bowels, when in fact these are, concomitantly with the mental disturbance, results of the cerebral mischief. Doubtless these functional derangements exercise considerable influence on the progress of the case by assisting to deprave the general economy, and by producing depressing sensations in the region of the stomach. To them may probably be attributed, together with the apprehension of impending insanity, that phase of the disease spoken of by the older writers as the *stadium melancholicum*, which so frequently presents itself in incipient idiopathic cases.

During the earlier stages of the prodromal period it is impossible, in the majority of cases, for the physician to predict, with anything like certainty, whether the case may culminate in acute melancholia or acute mania. But as it progresses the irritability and restlessness which ushered in the malady become intensified; sleep is either irregular or may be lost for nights together; further degeneration of the brain constituents necessarily follows, and the loss of controlling power over ideas is manifested in excitement in one of two ways—(1) by the domination of one set of ideas, which are for the most part of a depressed character, or (2) by a tendency to follow lines of thought suggested by accidental external circumstances. Although in the one case there is a concentration and in the other a diffusion of ideas, there is the common result of occlusion of the individual from a normal process of thought, in consequence of his inability to review external circumstances correctly.

1. *Acute Idiopathic Melancholia* presents itself in three degrees of intensity:—(1) simple depression of feeling, (2) depression of feeling with delusion, (3) depression of feeling with mania or delirium. The second and third of these conditions may supervene on the first. or any one of them may singly characterize the case.

Simple Depression of Feeling.—In no form of insanity is the sane mind more prone to project a psychological scheme of causation than in that of which simple depression of feeling is the predominant symptom. The restlessness and irritability which accompany anxiety, grief, and worry, and the consequent exhaustion and depression, suggest a psychological continuity. There is, however, a very distinct difference between depression of feeling within the limits of health and the depression of feeling resulting from morbid processes going on in the brain, and in symptoms there is a distinct line of demarcation. A mere fit of depression, from whatever cause, does not prevent a man from using his intellectual faculties; circumstances influence him, and he can review his position; but where the limit of health is passed the normal influence of external circumstances is lost. This indication is accompanied by a gloomy apathy; the memory of the past is misery, the present is unendurable, and there is no hope in the future; everything is black within and without, every incident feeds the melancholy, every suggestion of hope is parried, and every appeal to the reason falls dead on the ear of the sufferer. This latter symptom—the inoperativeness of appeals to the reason—is a feature of all forms of insanity, and it is therefore well to notice it particularly when treating of the simplest. What to the sane mind is the simplest proposition, to the insane appears either utterly false in itself, or to have no bearing on the position. The power of comparing idea with idea, the faculty of discriminating their differences, or the perception of agreement in the midst of difference is lost—in a word, the judgment is impaired or utterly in abeyance. The common everyday expression "out of his judgment," employed to indicate that a man is insane, is psychologically accurate, and logically applicable in all forms of insanity. A strong tendency to suicide frequently presents itself; the utmost ingenuity is exercised to accomplish this object, the whole mental energies being concentrated upon it. It is impossible to render in terms the general as well as facial expression of the melancholic; it cannot be simulated with success before anyone conversant with the condition.

Depression of Feeling with Delusion.—Idiopathic melancholia symptomatized by simple depression of feeling may become gradually complicated with delusion and hallucination, or this complicated condition may follow immediately on the initial symptoms. The delusions and hallucinations of idiopathic melancholia may be divided into three classes—(1) those traceable to perverted sensation produced by implication of the functions of the general system; (2) those apparently dependent on the nature of the primary causating train of emotion; and (3) those which it is impossible to connect with any particular influence, either psychical or somatic. The first class contains the delusional symptoms resultant on atony of the alimentary canal, which, by producing obstinate constipation, catarrhal affections of the stomach and bowels, and dyspepsia, cause sensations which are referred by the insane mind to supernatural influences—he believes that he has serpents or worms inside him, that his gullet is closed, or that his bowels are so obstructed as to render relief by the natural passage impossible. As a direct result of this delusion food is systematically refused, and it often becomes necessary to result to artificial feeding by the stomach-pump or some allied apparatus. Hallucinations and illusions of smell and taste may be referred to the same causes as the delusions just spoken off—the fetor of the breath due to dyspepsia may suggest to the melancholic that he is surrounded by a poisonous atmosphere, and that everything near him stinks; and the foul tongue of the same condition may be productive of hallucinations of taste, and may even lead up to the very common delusion that his food is poisoned. Such distinct objective starting points, however, do not suggest themselves for hallucinations of vision and hearing; these can only be regarded as incidental results of the morbid cerebral condition of which the process of production is unknown. Hallucinations of sight are comparatively rare; when they do occur it is generally in the form of specters, which prompt to suicide, self-mutilation, or homicide. Hallucinations of hearing are more common, and are believed to be of graver import. As a rule the hallucination takes the form of words emanating from a something or someone of whose personality the patient has no conception. That an apparent connection can often be traced between the character of the delusion and that of the primary causating emotion is particularly true of the melancholic delusions which follow on religious emotionalism, so much so that many writers regard religious melancholia as a distinct form of insanity. This is a term, however, very loosely employed, and it is, in fact, by no means easy to ascertain what it implies; by one section of authors it is regarded as that form of melancholia in which the insanity centers upon religious ideas, by another as the form of insanity produced by depressing religious emotion. The latter position is tenable on purely clinical considerations, if the insanity retains the character of the causating emotion, which it very frequently does not; the former is open to the objection that the delusions may be mere accidents in a case, and may bear no relation whatever to the exciting psychical cause. One reason why the term is so strongly impressed on the mind of the public is, that it may appear as pseudo-epidemic. The waves of religious emotionalism, which almost periodically disturb society in the form of "revivals," are apt to produce explosion of psychical action in those members of the community predisposed to nervous degradation. The public never considers, in fact does not know, that any other equally potent cause of emotion might be as effectual, and therefore sets down such accidental congeries of cases as "religious melancholia," accepting that term as representing all the abnormal psychical conditions which may result from "revivals." It is better to consider religious influences in the common category of emotions producing over-excitation of the brain. The deep despondency which follows on religious emotionalism may be productive of such predominating ideas as that the soul is irretrievably lost, that the unpardonable sin has been committed, and that there is no hope of salvation. Although in the abstract it is open to question whether such predominating ideas are strictly delusions, inasmuch as they may be considered as morbid exacerbations of fears and anxieties suggested by certain schools of religious thought, still in the concrete they amount to delusion; for, even supposing they have been arrived at by a normal process of reasoning—which in most cases is extremely doubtful—they are maintained at the expense of all other religious considerations, and by the exclusion of all arguments founded on the experience of others.

The delusions which it is impossible to connect with any particular physical or psychical influence are for the most part characterized by suspicion and fear, and take such forms in the mind of the patient as that spies surround him, that all his actions are watched, that all connected with him are plotting against him, that conspiracies are being organized with a view to deprive him of his estate, procure his ruin, or do him some evil of which he can give no definite explanation. Occasionally delusions of fear and suspicion are connected with persons whom the patient has never seen, or with sections of society, such as political parties or religious communions. Self-accusation of serious crimes is a frequent result of delusion. This idea of crime may be entirely unsubstantial, or it may possess some very slight foundation in fact, one which has no rational bearing on the existing position. When insane self-accusations are critically examined, it is found that remorse is very rarely connected with the real or imaginary crimes, from the consequences of which others have or might have suffered. The poetic stories of insanity produced by remorse of conscience for crimes involving the ruin or disgrace of others than the actual offenders may be set down as in the main apocryphal.

The delusions of the melancholic are often fearfully intense, and produce very serious results in action; they are apt to extend beyond himself By a process of reasoning which the sane mind cannot appreciate, he may argue himself into the belief that his misery is also the misery of his friends and family, that his relatives are cognizant of or implicated in his imaginary crimes, and that they must suffer the consequences along with him. As death offers to him the only chance of relief, so he believes it best that those nearest and dearest to him should die also. From this state of feeling follow those fearful acts of homicide which occasionally startle society—a parent destroys several of his children, a lover his mistress, or a husband his wife, before committing self-destruction. It is as well to attract attention here to the appearance of a tendency to homicide and suicide as an incident in a case, as the subject will have to be recurred to when adverting to the question of homicidal and suicidal insanity.

Depression of Feeling Associated with Delirium or Mania.—In this class of cases it is impossible to say whether they should be called melancholic mania or maniacal melancholia. The wildest delirious excitement coexists with the deepest depression of feeling; delusions of fear and horror are given expression to in the most extravagant manner, and relief from them is sought in frantic attempts at suicide; the patient dashes his head against the floor or wall, tries to cast himself down-stairs, holds his breath in the hope that he may suffocate. In this condition there is a strong tendency toward death, which not infrequently occurs within a few days of the development of the graver symptoms, and which is generally produced by congestion of the lungs as a direct result of the cerebral condition, *i.e.*, by a true cerebral pneumonia.

2. *Acute Idiopathic Mania* presents itself in three forms:—(1) simple exaltation of feeling, (2) exaltation of feeling with delusion, (3) acute delirious mania. The second and third of these psychical conditions may supervene on the first, or any one of them may singly characterize a case; in all, the period of transition from the prodromal stage is much more rapid than in acute idiopathic melancholia.

Simple exaltation of feeling manifests itself in all degrees of intensity between mild general excitement and the extreme forms of maniacal furor; in kind it may not amount to more than a decided increase of the initial symptoms of restlessness, irritability, and change of disposition; in degree it is characterized by greater or less excitement of thought, word, and action. The general vague restlessness and irritability of the prodromal period not only become exacerbated, but manifest a tendency to produce results in action. Excited action may show itself either in a general exaltation or in the suspension of normal trains of thought. A prominent example of the first psychical condition is found in the naturally devout mind under certain conditions of excitement: the habitually religious man may have meditated on schemes for self-conduct, the good of mankind, or the spread of religion, schemes which, so long as mental action was under control, were mere projects, things to be hoped for, but which under morbid excitement assert themselves so powerfully as to be regarded by the unbalanced mind as immediate necessities, to be procured at the expense of all considerations. The real distinction of religious mania from religious enthusiastic excitement consists, not in the form of the ideas for which parallel cases might be found in sanity and insanity, but in the *per saltum* manner in which it is sought to carry them into action, in the leaving out of those links which the sane mind uses to decide on the adoption or rejection of a scheme, but the omission of which transfers the scheme suddenly from the region of imagination and hope to one of present reality. There is an absence of religious totality; the patient is bound up in some scheme for the advancement of religious knowledge, in some project for the building of a church, the founding of a school, the establishing of a mission, or, more probably, for all at once; for this he neglects his family, all social considerations, and those duties which are the precepts of his faith. Whether the apparently efficient cause be religion, politics, or the prominent social question of the day, the results are identical, being only conditioned by the nature of the original idea. The ordinary behavior of the man is changed; he is ever on the move; his gestures, loud tone of voice, volubility of talk, and general manner are such as to cause his friends distinctly to mark the change. A large proportion of such cases recover under appropriate treatment, but they not infrequently pass into acute delirious mania. When the disease is manifested by the suspension of the ordinary trains of thought, the symptoms consist, for the most part, in recklessness of action and conversation; there is a sort of exalted joyousness, a strong tendency to dissipation, loud and wild though not necessarily incoherent talk, extreme restlessness, and utter want of respect for all conventionalities. Such patients (reputable members of society, be it remembered, a month or a week before) outrage all sense of decency; they may walk the streets with strumpets, and appear drunk in public, forcing their behavior on the notice of the police. They care nothing for the feelings of friends or the prospects of their families. The intellectual faculties may be active; thus wit and humor, uncontrolled by any feelings of consideration for others, may stand out all the more prominently. The condition, taken over all, is very closely allied to that stage of intoxication in which the poison of alcohol sets free all controlling influences. When the restraining power of association is lost, there is no difficulty in comprehending that the uncontrolled brain may act in any direction. This class of cases is specially emphasized, because they are apt to be mistaken by the public for instances of mere moral obliquity.

The relation of amount of mental disturbance to the degree of excitement is not definable; mania may be extreme, and the disturbance of ideas apparently slight, and *vice versa*. It is of great importance that the two following facts should be insisted on:—(1) that mania of an extreme description can exist without delusion; and (2) that mania of a dangerous nature may exist without furious excitement. It is in this class of mania that cases of so-called *folie raisonnante* are for the most part met with—a class strongly insisted on by many Continental authorities as of great pathological importance. By one section of foreign writers it is spoken of as *folie raisonnante*, by another under the original name suggested by Pinel *mania sine delirio*, while by a third both are used promiscuously to indicate a class of cases in which, although considerable disturbance and excitement may exist, the sufferer is able to justify his course of action by a line of reasoning not illogical in itself, although founded on false premises.

Exaltation of feeling with delusion or delusional mania, whether it follows on a period of simple exaltation of feeling, or is coexistent with the first symptoms of excitement, is not to be connected with the originating psychical cause; indeed the intellectual confusion is so great and of such a kind as to render any analysis impossible. It is well to mark here the psychological difference between maniacal and melancholic delusions; the latter are persistent in character and appear to proceed from within, the former are changeful and are readily acted on from without. The general expansiveness of ideas, the rapidity with which they are produced and influenced by external objects, along with the inability to correlate idea with idea, are productive of incoherence in thought, word, and action. For instance, a man may imagine and state that he is the king of the universe, at the same time that he enters no remonstrance against herding and eating with his fellow paupers; he may assert his superiority, but may not object to obey the behests of a common keeper.

Acute delirious mania is a condition often rapidly produced and not infrequently fatal. It may be the culmination of a case which has passed through the stages of simple exaltation of feeling and mania with delusion—the latter rarely; or it may appear in a few days or even a few hours as the result of some severe mental shock. It may persist for only a short time, and is then spoken of as acute transitory mania. The symptoms are very definite—the wildest yells and screams, a frenzied rushing to and fro, a reckless casting of the body on the ground or against the walls and furniture, smashing everything that comes in the way without any definite purpose save smashing, flushed features, clammy sweat, and a high bounding rapid pulse; nothing can control the patient but physical force, for his fury renders him blind to all influences.

3. *Acute Primary Dementia.*—This disease is of rapid incidence. It may result from sudden psychical disturbance, especially fright; occasionally no cause can be traced. After a few days or hours, during which the patient is somewhat stupid and apathetic, these symptoms increase to such a degree as to cause him to be, to all outward appearance, utterly demented; he sits unaffected by anything that goes on around him; he is completely helpless, cannot take off or put on his clothes nor feed himself, and passes urine and fæces where he sits or stands; he is speechless, and cannot be roused to action by any appeal; his movements are slow, when he can be got to move at all; but the chief motor symptom is a degree of catalepsy. It may be said with truth that the condition is one of mental and bodily catalepsy. Such cases to the ordinary observer appear utterly hopeless. There is a strong tendency toward death; but, when this is overcome, it often happens that the sufferer gradually emerges from the condition, and can give an account of the sensations experienced during his illness. It may terminate in dementia of a very low type. Post-mortem examination of recent cases frequently reveals dropsy of the brain, or changes in interstitial tissues producing pressure. (See Blandford, *Insanity and its Treatment;* Bucknill and Tuke, *Psychological Medicine;* Griesinger, *On Mental Diseases.*)

General Paralysis of the Insane.—General paresis, progressive paralytic dementia, or, as it is more frequently spoken of, *general paralysis*, is a disease of the superior and lateral convolutions of the brain, which gradually extends over the whole nervous system, producing a peculiar impairment of motor power and invariably accompanied by insanity. It is marked by well-defined series of physical and psychical symptoms, and terminates in a peculiar manner within a definite period.

General paralysis was first recognized as a special disease in France; it was indicated by Esquirol, and its history was fairly elucidated by Bayle, Delaye, and Calmeil, the latter giving it the name of *paralysie generale des alienes.* General paralysis is a common disease, and is generally spoken of as "softening of the brain," a term diametrically opposed to its pathological anatomy. The condition is essentially a chronic diffuse subinflammatory overgrowth of the connective tissue of the cerebral hemispheres, leading to destruction of the true nerve elements, and principally affecting that region of the brain in which recent observers have localized the cortical motor centers. General paralysis is said to be a disease of middle life; this is to a certain extent true, for, in the large majority of cases, its incidence occurs between the ages of thirty-five and fifty; it is, however, met with prior to the first-mentioned age, less frequently after the latter period of life. Statistics show that the decade between forty and fifty is the one during which the disease is most likely to occur. Men are more subject to it than women, in the proportion of, at least, eight to one; in women the symptoms are less strongly pronounced, and the disease runs its course more slowly. Although the relative frequency of the disease appears to be equal in the higher and lower classes of society, statistics show that the town artisan is more liable to it than the agricultural laborer. In the lower grades of society general paralysis is much more common in England than in Scotland or Ireland; in certain English asylums general paralytics constitute from a sixth to an eighth of the inmates, while in Scotch and Irish district asylums the proportion does not amount to more than 2 or 3 per cent.

The progressive character of the disease is marked by three stages, termed the prodromal, the acute, and the terminative. The *prodromal stage* is marked by a somewhat incongruous congeries of mental symptoms, consisting of total change in the habits and disposition, general restlessness and irritability, impairment of memory, extravagance in thought and action, and a peculiar facility closely followed by, or intercurrent with, the bodily symptoms of impaired mobility of the face and tongue. For the purposes of diagnosis the physical are more important than the mental phenomena. As a rule the *bouleversement* of disposition is peculiarly well marked; the impairment of memory consists, not only in the blurring and confusion of past events, but in the forgetting of the occurrence of one minute in the next—purposes formed and intentions expressed are forgotten almost as soon as formed and expressed. This want of fixity is also shown by the non-recognition of the lapse of time, and by the manner in which violent passion is suddenly changed into amiability. To the same cause may probably be traced the peculiar facility of disposition of the general paralytic; even at this early stage there are indications of the optimism which, as the case progresses, affords the characteristic psychical symptom. In the prodromal period it is manifested by a degree of morbid vanity, general exaltation, and a tendency to regard all things in the brightest possible light. The physical symptoms consist in a finely fibrillar action of the muscles of the tongue, twitching of the upper lip, hesitancy of speech, and a loss of facial expression; the tongue symptom consists of a rapid agitation of its surface, the voluntary movements of the whole organ not being entirely under control, *e.g.*, it is protruded with a jerk; the upper lip hangs and trembles before utterance like that of one struggling against weeping; the hesitancy of speech can best be illustrated by saying that it is identical with the slurring of words in the first stage of intoxication—the patient "speaks thick;" the face assumes a mask-like want of expression—the muscular power being impaired to such a degree as to cause change of expression to be a comparatively slow process. As the disease advances there is greater excitability, and the general exaltation of ideas becomes so great as to lead the patient to the commission of insanely extravagant actions, such as purchases of large numbers of useless articles, or of lands and houses far beyond his means, numerous indiscriminate proposals of marriage, the suggestion of utterly absurd commercial schemes, or attempts at feats utterly beyond his physical powers. Not infrequently he is found committing theftuous acts. The *acute period* is frequently ushered in by maniacal symptoms which generally assume the type of what is termed by French writers *delire ambitieux.* Delusion of the wildest character may now present itself; the patient may believe himself to be in possession of millions of money, to be unsurpassed in strength and agility, to be a great and overruling genius, and the recipient of the highest honors. Every idea is expanded and exalted, whether it relates to time, space or personal attributes. Although grandiose and extravagant delusion is very frequent, existing as it does in about one-half of all cases, it is by no means such a persistent symptom as the *bien etre*, which condition is the diagnostic of the disease in that it is invariably present. This is shown by perfect contentment with himself and all things around him, by the constant use of superlatives and such expressions as "all right," "splendid," "first rate;" he speaks of his health as robust, "never better in my life," even when there is grave constitutional disturbance; he is unaffected by the death of child, or wife, or nearest friend. He is utterly unsuspicious, lost to all appreciation of social relations, and facile in the extreme. Synchronously with this condition, the physical symptoms become exacerbated; the tongue and facial symptoms already spoken of increase in intensity, and in addition impairments of the motor powers of the extremities present themselves, consisting in a loss of co-ordinating power, not in a loss of muscular strength. Thus the gait becomes straddled and uncertain; there is a widening of the basis of support; he has to pick his steps as he goes up and down stairs, and is apt to trip over small obstacles; the action of walking resembles that of a half-drunk man. Later on the arms become involved. The pupils are often irregular. The third or *terminative stage* is marked by "epileptiform" or more properly apoplectiform attacks, the general condition becoming more and more degraded. By this time the patient is almost bedridden; actual palsy often occurs. Toward the end certain of the semivoluntary muscles are affected; bed-sores may form; and he may die slowly of exhaustion or suddenly during an apoplectiform attack. General paralysis runs its course in from one to four years; more rapid and more protracted cases are on record, but, taken over all, eighteen months may be stated as its average duration. The disease is incurable.

II. Traumatic Insanity.—Generally speaking, insanity is not developed for some months or even years after receipt of the injury, but in the interval the patient suffers from headache, more especially after mental effort, irascibility of temper, confusion of thought, and consequent inaptitude for business, weakened memory, and a constant feeling of fatigue. If this condition is not overcome, a progressive dementia sets in, of which the special character is violence of temper, and a tendency to impulsive action. This dementia is generally complicated with maniacal attacks intervening at uncertain periods and marked by furor or violence. Dipsomania or insane drinking is a not very uncommon result, apart from all other indications of aberration. Prognosis is unfavorable.

III. Insanity Associated with other Neuroses.—*Epileptic Insanity.*—In the intervals between the fits the patient is generally stupid and dull of apprehension. Immediately before or after fits, or, as some believe, occasionally taking their place, mania of a violent and furious, of a subacute, or of an ecstatic character presents itself. All authorities recognize epileptic insanity as the form most dangerous to the public. Prognosis is unfavorable. *Hysterical Insanity.*—The symptoms described in the article HYSTERIA may become so exacerbated as to amount to insanity. Superadded to these may be delusions of a sexual nature. The most extreme form of mental disturbance supervening on hysteria is acute mania of a very violent character; it is generally of a delirious nature, but does not usually continue for any great length of time. It is open to question whether the "fasting girls" and women with "stigmata" should not be included among the hysterically insane. Men, although very rarely, are liable to this form of insanity. In a sense the prognosis is favorable, inasmuch as prolonged treatment procures great abatement of symptoms, if not actual recovery. *Insanity occurring with locomotor ataxy* strongly resembles general paralysis. Taken over all, it may be stated that the symptoms differ more in degree than in kind, not being so intense. There is not the same extravagance of delusion or violence of mania.

IV. INSANITY FROM THE PRESENCE OF ADVENTITIOUS PRODUCTS is marked by progressive dementia of a dull, heavy character and the absence of delusion. Prognosis is unfavorable.

V. INSANITIES ASSOCIATED WITH MORBID CONDITIONS OF THE GENERAL SYSTEM.—*Phthisical insanity* is stated to be characterized by a short period of mania, melancholia, or delusion, which soon passes into a mixture of subacute mania and dementia. The symptom, according to Clouston, is a tendency to be suspicious. (Consult Clouston, "Tuberculosis and Insanity," *Journ. of Mental Science*, April, 1863.) *Rheumatic insanity* is characterized by hallucinations of sight, touch, and taste, loss of memory, acute delirium succeeded by confusion of ideas and sluggishness of mind, accompanied by choreic movements of the limbs, deadening of reflex action, and even paralysis. These symptoms appear as the articular affection diminishes or disappears; they are, as it were, one vicarious of the other. Prognosis is favorable. (See Griesinger *On Mental Diseases*, p. 189; Clouston, *Journ. of Mental Science*, July, 1870; Sibson, in Reynolds' *System of Medicine*, vol. iv. p. 286.) In *gouty insanity* the alternation of the joint and head symptoms is also well marked. The latter are general mania with delusions of suspicion. Prognosis favorable. (*Vide* Berthier, *Annales Medico-Psychologiques*, 1869. Sydenham also alludes to the condition.) *Syphilitic insanity* frequently commences with acutely maniacal symptoms, shortly followed by hypochondriasis of marked character, paralysis of energy, and rapid progressive dementia. Extravagant delusions often present themselves so strongly as to render the diagnosis between this condition and general paralysis difficult. Prognosis unfavorable. (The most important paper on this form of insanity is by Mickle, *Brit. and For. Medico-Chirurgical Review*, July and October, 1876.) In *anæmic insanity*, however produced, the general train of symptoms is violent mania of short continuance followed by melancholic dementia. Prognosis favorable.

VI. INSANITIES OCCURRING AT EVOLUTIONAL PERIODS OF LIFE.—*Insanity of pubescence and adolescence* is manifested by various trains of symptoms. Acute mania is on the whole the most common—it is characterized by motor restlessness; the patient walks, talks, smokes, drinks, must ever be on the move. Where self-abuse comes in as a factor, the sufferer is melancholic and suspicious, self-accusing. Dipsomania is a not infrequent symptom. But whatever may be the general symptoms of these three sets of patients, they have one common symptom, a perversion or increase of the sexual instinct. Prognosis is favorable as regards the attack present, unfavorable as to the probability of recurrence. *Climacteric insanity*, which is nearly as common in men as in women, is marked by pretty constant symptoms of a melancholic character. Prognosis generally favorable. *Senile insanity* is symptomatized by dementia with frequent intercurrent attacks of mania. Prognosis unfavorable. The most frequent symptoms of the *insanity of pregnancy* are melancholy and moral perversion, the latter taking the form of dipsomania. *Puerperal insanity* shows itself during the first seventeen days after labor, and is of sudden incidence; the mental symptom is acute delirious mania. Prognosis is favorable in this, as in the insanity of pregnancy. (*Vide* J. Batty Tuke, "On Puerperal Insanity," *Edin. Med. Journ.*, May, 1865, and June, 1867.)

VII. TOXIC INSANITY.—*Insanity of alcoholism* in the acute form may be marked by acute mania of a transient nature, *mania a potu;* by melancholia, frequently accompanied by delusions and hallucinations of a frightful character; in the chronic, by a type of dementia frequently simulating general paralysis. Prognosis of the acute form favorable, in the chronic the reverse.

In employing the above classification it must be clearly borne in mind that the term of the symptom should, whenever possible, be appended to the pathogenetic term; thus, puerperal mania, climacteric melancholia, senile dementia, acute idiopathic mania, epileptic mania, etc. If the terms are combined, the nature of the disease and its general psychical characteristics are expressed in terse language.

It will be noted that no separate notice has been taken of such popular terms as homicidal or suicidal insanity. They in no wise indicate a class of the insane; they are symptoms common to many insanities, especially to epileptic, traumatic, puerperal, and idiopathic insanity, and as such must be regarded as incidents in a given case.

Terminations of Acquired Insanity.

Insanity terminates in recovery, in death, or in chronic mania or chronic dementia. Accurate statistics of the two first-named terminations are unattainable, as a large number of patients are treated at home; and asylum statistics do not therefore show the result overhead, only that of the more aggravated cases. The result of treatment in lunatic hospitals gives about 40 per cent., calculated on the admissions, which, however, include idiocy, chronic terminative insanity, and such acknowledged incurable forms of the disease as general paralysis. This figure does not of course represent the results of treatment of all the insanities, which, although there are no figures at command to support the assertion, may be fairly estimated at not less than 70 per cent., excluding idiocy. There is a general tendency of all insanities to shorten life; as already noted, some are in themselves fatal, or render their subjects less able to withstand disease. Asylum statistics show from 7 to 8 per cent. per annum as the average mortality calculated on the numbers resident.

Treatment.—The history of the treatment of insanity is divisible into three epochs—the barbaric, the humane, and the remedial. But this does not take into account the very highly humane and probably highly remedial system of treatment which obtained in very ancient times. In Egypt the temples of Saturn, and in Greece the Asclepia, were resorted to by lunatics, and the treatment there adopted was identical in principle with that of the present day. The directions given by all the classical medical authors, and especially Hippocrates and Galen, are of the soundest character. How long their influence existed it is difficult to say, but in the Middle Ages, and up to the middle of the last century, little attention was paid to the care or cure of the insane. A small proportion were received into monastic houses or immured in common jails. In 1537 a house in Bishopsgate street, London, fell into the possession of the corporation, and was appropriated for the reception of fifty lunatics. This, the first Bethlehem Hospital or Bedlam, was removed in 1675 to Moorfields, and in 1814 the present hospital in St. George's Fields was erected. St. Luke's was instituted in 1751. Bedlams, or houses of detention for lunatics, appear to have existed in other cities, but, with these exceptions, no provision was made for the insane, who were allowed to wander at large. There is good reason for believing that many were executed as criminals or witches. About 1750 the condition of the insane attracted some amount of public attention, and the incarceration in madhouses of a considerably larger number than formerly followed, not on account of any philanthropic sympathy with their condition, but as a measure demanded for the public safety and comfort. But this measure by no means brought about the termination of the barbaric period. The houses, misnamed asylums, were in the hands of private parties, under little or no supervision, and were, in fact, merely prisons of the very worst description. The unhappy inmates were immured in cells, chained to the walls, flogged, starved, and not infrequently killed. It is almost impossible to believe that this condition of matters existed far on into the present century. According to Conolly, "there is clear proof of the continued existence of these abuses in 1827; and it cannot be denied that not a few of them survived in some public and private asylums in 1850." Matters were no better in France when Pinel was appointed in 1792 to the charge of the Bicêtre, the great hospital of Paris for male lunatics. In that establishment, and in the Salpetrière, the condition of the inmates was as degraded as in the British madhouses. This great philanthropist adopted the bold step of striking off the chains and other engines of restraint from those under his care. About the same time, the most gross abuses having been brought to light in connection with the management of the City of York asylum, William Tuke, a member of the Society of Friends, was mainly active in instituting the York Retreat for the care and cure of insane members of that sect. This real asylum was conducted on non-restraint principles. The names of Pinel and Tuke are indissolubly connected with the history of the humane treatment of the insane, and to their efforts must be ascribed the awakening not only of the public but of the medical profession to the true principles of management. It took, however, many years before the principles laid down by these men were universally adopted. In 1815 a committee of the House of Commons brought to light many gross abuses in Bethlehem Hospital, and it was not till 1836 that mechanical restraint was entirely abolished in an English public asylum. This took place at Lincoln, where Dr. Gardiner Hill did away with all engines of restraint. Shortly afterward Conolly adopted the same line of treatment at Hanwell, near London, and through the influence of his example and precept the measure extended over the whole of Great Britain. Experience has shown that, as restraint of all forms is abandoned, the management of lunatics becomes easier. Walled-in airing-courts, barred windows, and strong, dark rooms have almost entirely disappeared, and in some Scotch asylums it is found practicable to discontinue the use of lock and key. It has been said that the type of insanity has changed within the last forty years; it would be more true to say that the type of treatment has changed. It is much less common nowadays to meet with those extremely violent forms of madness which entered into the description of many authors. With the reduction of restraint a higher order of supervision on the part of attendants is demanded, and as they are trained to rely more and more on the moral influence they can exercise over their charges, and less on mechanical apparatus, the patient is not so apt to resent control, and therefore a greater calm and contentment pervade the atmosphere of our asylum wards. This has been mistaken for a change in the type of the disease.

LAW.

The effect of insanity upon responsibility and civil capacity has been recognized at an early period in every system of law. In the Roman jurisprudence its consequences were very fully developed, and the provisions and terminology of that system have largely affected the subsequent legal treatment of the subject. Its leading principles were simple and well-marked. The insane person having no intelligent will, and being thus incapable of consent or voluntary action, could acquire no right and incur no responsibility by his own acts; his person and property were placed after inquiry by the magistrate under the control of a *curator*. The different terms by which the insane were known, such as *demens*, *furiosus*, *fatuus*, although no doubt signifying different types of insanity, did not infer any difference of legal treatment. They were popular names which were used somewhat indifferently, but which all denoted the complete deprivation of reason. During the Middle Ages the insane were but little protected or regarded by law. Their legal acts were annulled, and their property placed under control, but little or no attempt was made to supervise their personal treatment. In England the wardship of idiots and lunatics, which was annexed before the reign of Edward II. to the king's prerogative, had regard chiefly to the control of their lands and estates, and was only gradually elaborated into the systematic control of their persons and property now exercised in chancery. Those whose means were insignificant were left to the care of their relations or to charity. In criminal law the plea of insanity was unavailing except in extreme cases. About the beginning of this century a very considerable change commenced. The public attention was very strongly attracted to the miserable condition of the insane who were incarcerated in asylums without any efficient check or inspection; and at the same time the medical knowledge of insanity entered on a new phase. The possibility and advantages of a better treatment of insanity were illustrated by eminent physicians both in France and England; its physical origin became generally accepted; its mental phenomena were more carefully observed, and its relation was established to other mental conditions which had not hitherto been regarded as insane in the proper sense of the word.

The fact of insanity may operate in law—(1) by excluding responsibility for crime; (2) by invalidating legal acts; (3) by affording ground for depriving the insane person by a legal process of the control of his person and property; or (4) by affording ground for putting him under restraint.

INSCRIPTIONS in characters sometimes termed cuneiform or wedge-shaped, sometimes arrow-headed, have been found throughout a large part of western Asia—in Persia and Babylonia, Assyria and Media, Armenia and Mesopotamia. The names given to the characters are derived from their form, as some of them resemble the points of arrows, though most have the appearance of wedges, thicker at one end than at the other. This appearance is due to the fact that the characters were originally impressed upon moist clay by a metal stylus, and the form consequently assumed by them was subsequently imitated by the engraver upon stone and metal. The characters were primarily pictorial, but in course of time the outlines of the primitive pictures came to be alone preserved, while the nature of the writing materials caused curves to become angles, and rounded lines straight ones.

The original home of the cuneiform system of writing was either Elam or Babylonia, the inventors of the hieroglyphics in which it originated being the ancient Accadian population of Chaldea. It passed from the latter to a number of other nations, undergoing at the same time a variety of modifications. It was first borrowed by the Semitic settlers in Babylonia and Assyria, and from them it was handed on to the Turanian tribes of India, the Alarodians of ancient Armenia, and the Aryans of Persia, while the Turanian inhabitants of Elam or Susiania preserved the system as it had been in use among the Accadians of Chaldea.

In Babylonia, Assyria, Susiania, and Media the forms of the characters underwent several changes at successive periods, the tendency in each case being to simplify the characters by dropping superfluous wedges. In Babylonia we have to distinguish between the archaic, the linear, the hieratic, and the later forms of the characters. The archaic forms are principally found on bricks and cylinders of the Accadian epoch (before 2000 B.C.), and are the oldest forms of the characters of which we have contemporary specimens. The linear forms were in use at the same time, and are marked off from the archaic forms by being written in continuous lines instead of a series of wedges, and sometimes also by a closer resemblance to the original pictures from which they were derived. The hieratic forms were mainly employed between the overthrow of the Accadian power (about 1700 B.C.) and the eighth century B.C., more especially for contracts and similar documents. The later forms may be seen on the monuments of Nebuchadnezzar and his successors, a further modification of them being used for the Babylonian transcripts of the Persian cuneiform inscriptions. In Assyria also we may classify the characters as archaic, hieratic, and later (or Ninevite), though the forms they assumed in Assyria were not identical with those used in Babylonia which we have called by similar names. The hieratic forms were mainly employed in Assyria for ornamental or religious purposes, and may be compared with our own black letter. In Susiania the archaic forms of the characters lingered to the last, though in the northern part of the country simplified forms were in use. In Media a considerable difference may be observed between the peculiar forms of many characters in the older inscriptions of Mal-Amir and the forms borne by them in the Protomedic transcripts of the Persian monuments. The Armenian or Vannic characters were the same as those of Assyria, except that where one line or wedge had to be drawn across another, it was broken into two. But this was to prevent the stone from breaking at the point of section.

It will be noticed that the cuneiform characters were employed to express very different languages. The Accadian, like the allied dialects of Susiania and primitive Media, was agglutinative, and probably belonged to the Ural-Altaic family of speech; Assyrian and later Babylonian were Semitic; Persian was East Aryan; while the Armenian of Van seems to claim affinity with that Alarodian group of tongues of which Georgian may be regarded as the modern representative.

As already stated, the cuneiform characters were in their origin pictorial. In many cases it is possible to restore the primitive hieroglyphics or ideographs by the help of the archaic and linear Babylonian forms, and a fragment of a clay tablet has been discovered on which the pictorial originals of a few characters are given. In order to restore the primitive pictures, it is frequently necessary to turn a character upon its side, from which we may infer that the ideographs were once written vertically like Chinese.

The primitive pictures denoted either objects or ideas, the latter being represented metaphorically by the picture of one or more objects. "Life," for example, was expressed by the picture of a growing flower, "a month" by placing the numeral xxx. within the circle of the sun, which symbolized the day. But the same picture might denote more than one idea or object. Thus the circle of the sun represented not only "the sun" and "the day," but also "light," "brilliance," and the like; and a pair of legs represented the ideas of "going," "walking," and "running." By combining two or more ideographs together, fresh ideas might be symbolized to an almost infinite extent; "drinking," for example, is denoted by placing three drops which denoted water within the picture of the mouth, "language" by substituting the tongue for the three drops of water, and "a tear" by setting the ideograph of water before that of the eye.

Out of this early picture-writing there soon grew a syllabary. Accadian was an agglutinative language, which was already largely affected by phonetic decay, the result being that on the one hand the same word might be used indifferently for noun, verb, and adverb, as in English, while on the other hand the loss of final sounds had reduced a great part of the vocabulary to the condition of monosyllables. Ideographs consequently came to be associated with the sounds of the words which they primarily or most usually represented, and these words were mostly monosyllabic.

A further step in advance was now taken. An ideograph continued to represent the pronunciation of the word for which it originally stood, even when it no longer represented the word itself; that is to say, the pronunciation of the word it denoted became attached to it as a mere phonetic value. This important innovation, which amounted to a change of the old picture-writing into a syllabary, must have taken place at an early period in its history. Like the lexicographers of China, the lexicographers of Accad attempted to classify and arrange the characters of their syllabary. Every character received a name of its own, so that literary works could be copied from dictation. A list of primary characters was first drawn up, each of which was named from the object it originally represented. The remaining characters were regarded as compounds, and divided into two classes. The first class consisted of characters which differed from the primary ones in having extra wedges, the second class of those that were really compounds. This classification of the syllabary must have been completed at a very remote date, since the analysis of many of the compound characters can only be explained by the forms they bear in archaic Babylonian, and in some cases even the archaic Babylonian forms are not sufficiently primitive. We may gather from this some idea of the epoch to which the invention of the cuneiform system of writing reaches back.

As far back as the second millennium B.C. Semitic tribes were in possession of a part of Chaldea. Duigi, the son and successor of the first Accadian monarch of whom we have contemporaneous record, has left us an inscription in which the cuneiform system of writing is adapted to the expression of a Semitic language. By the seventeenth century B.C. the Accadian language seems to have been wholly superseded by Semitic Babylonian and its northern dialect Assyrian.

The real difficulty the cuneiform syllabary offers to the decipherer is not the polyphony of the characters, but one which would not have been felt by the Assyrians themselves. Accadian and Assyrian phonology did not always agree, and in borrowing the Accadian system of writing the Assyrians had to adapt the sounds of their own language, as best they could, to the phonetic symbols of another.

The Assyrians continued to follow the example of the Babylonians in writing on clay, but they also made use of papyrus and stone. This literature on clay is very extensive, and embraces every branch of study known at the time.

The learned court of Assur-bani-pal in the seventh century B.C. amused itself with essays in Accadian composition, the extinct language of primitive Babylonia standing in much the same relation to the Assyrians that Latin does to us. But literary Assyrian itself was fast becoming an artificial dialect. The Aramæan alphabet was introduced into Nineveh at least as early as the eighth century B.C., and, though Nebuchadnezzar and his successors continued to employ the cuneiform syllabary, the conquest of Babylon by Cyrus was a blow from which the old mode of writing never recovered. The literary dialect and the characters in which it was inscribed were more and more disused, and finally disappeared altogether. Commercial tablets, however, dated in the reigns of the earlier Arsacid princes, have been found written in cuneiform, and if M. Oppert's identification is correct, a deed of sale, now in the Zurich museum, and written in cuneiform characters, is dated in the fifth year of Pacorus, the contemporary of Domitian.

The Assyrian syllabary was borrowed by the Armenians and Minnians of Lake Van in the reign of a certain king named Lutipri in the ninth century B.C. The characters both in form and use are identical with those of Nineveh, except that the Armenians rejected the polyphony of the Assyrian syllabary, and with one or two exceptions used each sign with one phonetic value only.

After the occupation of Armenia by the Aryans, the use of the cuneiform character seems to have been discontinued, and no "Vannic" or Armenian cuneiform inscriptions are known to exist of later date than the seventh century B.C.

It was reserved for the Aryans of Persia to discover the ultimate capabilities of the cuneiform system of writing by reducing its characters to an alphabet of forty letters. These were divided into two classes, those with an inherent vowel *a*, and those which were followed by *u* and *i*. At the same time all the superfluous wedges were thrown away, and the forms of the characters thus simplified as much as their pronunciation. Doctor Oppert has pointed out the principle upon which the formation of this new alphabet was carried out. Some one meaning was selected among those a character might bear when used as an ideograph, and this was rendered by its Persian equivalent. The initial sound of the letter was the alphabetic value henceforth represented by the character. A few ideographs were retained along with the alphabetic characters. The Persian cuneiform alphabet, called "Assyrian letters" by Herodotus, seems to have been invented in the early part of the reign of Darius, and, being confined to monumental purposes, soon fell into disuse.

Possibly the reduction of the cuneiform syllabary into an alphabet was suggested by a previous acquaintance with alphabetic writing. In the Persian inscriptions the words are divided from one another by an oblique wedge. A similar division of words is found in one or two Assyrian inscriptions.

The earliest inscription in the Phœnician alphabet known to us is the stele of Mesha, king of Moab, found at Dhibân and belonging to the ninth century B.C. In this Mesha relates that after the death of Ahab his god Chemosh enabled him to shake off the yoke of Israel, to drive the Gadites out of Ataroth, and to fortify Kirhareseth, Aroer, Horonaim, Dibon, and other places. The language of the inscription differs only dialectically from Hebrew.

To the same form of the alphabet belong most of the Phœnician inscriptions on the engraved gems brought of late years from Assyria and Babylonia, among which may be mentioned a cone with the image of a "golden calf" and the names Shemaiah and Azariah.

The most important monument of the Sidonian period of the Phœnician alphabet is the sarcophagus of Eshmun'azar, son of Tabnith (? Tennes), "king of the Sidonians," which is probably of the sixth century B.C. It may, however, be later. The inscription upon it states that Eshmun'azer had restored the ruined temples of Sidon, and prays the gods to preserve to that city the possession of "Dor, Joppa, and the rich cornlands in the plain of Sharon." Other noteworthy monuments of the same period are the so-called "Second Sidonian Inscription," which records the installation of a subordinate "king of Sidon" by a "king of the Sidonians" of Phœnicia; the inscriptions from Citium in Cyprus of King Pumyathon and his father Melecyathon in the fourth century B.C., as well as the bilingual Phœnician-Greek and Phœnician-Cypriote inscriptions from the same island, the Phœnician-Cypriote inscription of Melecyathon having furnished Mr. George Smith with the key to the Cypriote syllabary; together with six inscriptions from Athens and two from Malta; and the three inscriptions found by M. Renan at Umm'-el-Awâmid on the Phœnician coast.

The numerous dedicatory inscriptions found on the site of Carthage are written in what is termed the Punic development of the Sidonian alphabet; all apparently belong to the Greek period. The most important Punic inscription is the tariff of sacrifices found at Marseilles in 1845, an abridged edition of which was discovered on the site of Carthage by Mr. Davis in 1860. The regulations contained in it have a striking analogy to many of those of Leviticus. Its date, however, cannot be very early, since it makes no mention of human sacrifices. The Punic alphabet was the source of those of Numidia and Bœtica, where inscriptions have been found.

The series of Aramæan inscriptions begins with the dockets on Assyrian contract-tablets of the age of Tiglath-Pileser II. and his successors, when Nineveh and Carchemish became the chief centers of trade in western Asia.

Starting from the first century B.C., the ruins of Palmyra and Taiba have furnished us with a large number of inscriptions in the Aramaic dialect of the locality. MM. de Vogué and Waddington alone have discovered more than a hundred of them. Most of them are written in what may be termed uncial characters, but there are a few in a cursive hand. Among the persons mentioned in them is Odeinath (Odenatus), the husband of Zenobia. Palmyrene inscriptions have been met with in Africa and Rome, and a bilingual one (in Palmyrene and Latin) has lately been found at South Shields, England.

The Nestorian Syrians carried their language and letters as far even as China. The celebrated inscription Sigan-fu is written in good Estrangelo of the eighth century. A Hebrew inscription has also been found at Khaï-fong-fu.

Ancient Hebrew epigraphy is poorly represented. The earliest Hebrew inscriptions are three from Siloam, one of which is addressed to "Baal of the temple," a fragment found in the streets of Jerusalem by M. Vernes, and a boundary stone discovered by M. Ganneau near Gezer. The royal names on the pottery found near the foundations of Solomon's temple are not Hebrew, but Phœnician. The Maccabean period has left us several inscribed monuments and coins.

Arabic epigraphy begins with the rise of Islam. Two systems of writing were used concomitantly, the Cufic or uncial, and the Neski or running hand, neither of which, however, can be derived from the other. The earliest inscriptions yet known are two sepulchral ones, the first of which has been published by Wetzstein, Waddington, and De Vogué, while the other has lately been discovered by Sachau at Zebed. A Cufic inscription, dated 693 A.D., has been copied by De Vogué, at Jerusalem, and the old cemetery near Assuan contains a large number of similar inscriptions, some of which, as deciphered by Count Amari, contain the names of the companions of the prophet. Unfortunately this cemetery has never been thoroughly examined. Mention may also be made of Cufic inscriptions at Bozra, in Sicily, and elsewhere. Inscriptions in Greek and Neski Arabic have been found at Damascus, Tiberias, and other places, one of which is dated 696 A.D., while others are even older.

GREEK.

Etymologically the term inscription would include much more than is commonly meant by it. It would include words engraved on rings, or stamped on coins, vases, lamps, wine-jar handles, etc. Giving the term inscription a somewhat narrower sense, we still include within it a vast store of documents of the greatest value to the student of Greek civilization. It happens, moreover, that Greek inscriptions yield the historian a richer harvest than those of Rome. Partly from fashion, but partly from the greater abundance of the material, the Romans engraved their public documents (treaties, laws, etc.) to a large extent on bronze. These bronze tablets, chiefly set up in the Capitol, were melted in the various conflagrations, or were carried off to feed the mint of the conqueror. In Greece, on the contrary, the mountains everywhere afforded an inexhaustible supply of marble, and made it the natural material for inscriptions. Some Greek inscribed tablets of bronze have come down to us, and many more must have perished in the sack of cities and burning of temples. A few inscriptions on small, thin plates of lead, rolled up, have survived; these are chiefly imprecations on enemies or questions asked of oracles. But as a rule the material employed was marble. These marble monuments are often found *in situ;* and, though more often they were used up as convenient stones for building purposes, yet they have thus survived in a more or less perfect condition.

Inscriptions were usually set up in temples, theaters, at the sides of streets and roads, in temple precincts, and near public buildings generally. At Delphi and Olympia were immense numbers of inscriptions—not only those engraved upon the gifts of victorious kings and cities, but also many of a more public character. At Delphi were inscribed the decrees of the Amphictyonic assembly, at Olympia international documents concerning the Peloponnesian cities; the Parthenon and Acropolis were crowded with treaties, laws and decrees concerning the Athenian confederation; the Heræum at Samos, the Artemisium at Ephesus, and indeed every important sanctuary, abounded with inscriptions. It is a common thing for decrees to contain a clause specifying where they are to be set up, and what department of the state is to defray the cost of inscribing and erecting them. Sometimes duplicates are ordered to be set up in various places; and, in cases of treaties, arbitrations and other international documents, copies were always set up by each city concerned. Greek inscribed marbles varied considerably in their external appearance. The usual form was a plain slab, from three to four or even five feet high, three or four inches thick, tapering slightly upward from about two feet wide at bottom to about eighteen inches at the top, where it was either left plain or often had a slight molding, or still more commonly was adorned with a more or less elaborate pediment; the slab was otherwise usually plain. Another form was the altar, sometimes square, oftener circular, and varying widely in size. It was also common to inscribe state documents upon the surface of the walls of a temple, or other public building. The workmanship and appearance of inscriptions varied considerably according to the period of artistic development. The letters incised with the chisel upon the wall or the stele were painted in with red or blue pigment, which is often traceable upon newly unearthed inscriptions.

The primary value of an inscription lay in its documentary evidence. In this way they are continually cited and put in evidence by the orators. But the Greek historians also were not slow to recognize their importance. Herodotus often cites them, and in his account of the victory of Platæa he had his eye upon the tripod-inscription. Thucydides' use of inscriptions is illustrated by numerous passages in his works. Polybus used them still more. In later Greece, when men's thoughts were thrown back upon the past, regular collections of inscriptions began to be made by such writers as Philochorus (300 B.C.), Polemo (second century B.C.), Aristodemus, Craterus of Macedon, and many others.

At the revival of learning, the study of inscriptions revived with the renewed interest in Greek literature. Cyriac of Ancona, early in the fifteenth century, copied a vast number of inscriptions during his travels in Greece and Asia Minor; his MSS. collections were deposited in the Barberini library at Rome, and have been used by other scholars. Succeeding generations of travelers and scholars continued to collect and edit, and Englishmen in both capacities did much for this study.

Thus early in this century the store of known Greek inscriptions had so far accumulated that the time had come for a comprehensive survey of the whole subject. And it was the work of one great scholar, Augustus Boeckh, to raise Greek epigraphy into a science. At the request of the Academy of Berlin he undertook to arrange and edit all the known inscriptions in one systematic work. He lived to see the work completed, although other scholars were called in to help him to execute his great design.

Meanwhile the liberation of Greece and increasing facilities for visiting the Levant combined to encourage the growth of the subject, which has been advanced by the labors of many scholars, and chiefly Ludwig Ross, Leake, Pittakys, Rangabé, Le Bas, and later by Meier, Sauppe, Kirchhoff, Kumanudes, Waddington. Together with the development of this school of writers, there has gone on a systematic exploration of some of the most famous sites of antiquity, with the result of exhuming vast numbers of inscriptions.

The result of this has been that Boeckh's great work, though it never can be superseded, yet has ceased to be what its name implies. The four volumes of the *C. I. G.* contain about 10,000 inscriptions. But the number of Greek inscriptions now known has been estimated at 20,000 or 30,000.

ROMAN.

Roman Inscriptions (by which general name are designated, in classical archæology, all non-literary remains of the Latin language, with the exception of coins, letters and journals) fall into two distinct classes, viz. (1) those which were written upon other objects of various kinds, to denote their peculiar purpose, and in this way have been preserved along with them; and (2) those which themselves are the objects, written, to be durable, as a rule, on metal or stone. The first class is that of *inscriptions* in the stricter sense of the word (styled by the Romans *tituli*, by the Germans *Aufschriften*); the second is that of instruments or charters, public and private (styled by the Romans first *leges*, afterward *instrumenta* or *tabulæ*, and by the Germans *Urkunden*. No ancient Latin authors have professedly collected and explained or handed down to us Roman inscriptions. Some of the orators and historians, such as Cicero, Livy, Pliny the elder, and Suetonius among the Latins, and Polybus, Dionysius of Halicarnassus, and Josephus among the Greeks, occasionally mention inscriptions of high historical interest. A few grammarians, as for example, Varro, Verrius Flaccus, and Valerius Probus of Berytus, quote ancient words or *formulæ* from them, or explain the abbreviations used in them. Juridical instruments, laws, constitutions of emperors, *senatus consulta*, and the like appear here and there in the various collections of Roman jurisprudence.

Inscriptions have been found in nearly every center of ancient Roman life, but, like many other remains of antiquity, only seldom in their original sites. The great mass of them has to be sought for in the large European museums of ancient art, and in the smaller local collections of ancient remains which occur nearly everywhere in the European provinces of the former Roman empire, as well as in the north of Africa, and also here and there in Asia Minor.

Only those copies of inscriptions are to be received with full confidence which are furnished by experienced and well-equipped scholars or which have been made with the help of mechanical methods (casts, photographs, moist and dry rubbings) not always applicable with equal success, but depending on the position and the state of preservation of the monuments.

INSECTIVOROUS PLANTS. Insectivorous or, as they are sometimes more correctly termed, carnivorous plants are, like the parasites, the climbers, or the succulents, a physiological assemblage belonging to a number of distinct natural orders. They agree in the extraordinary habit of adding to the supplies of nitrogenous material afforded them in common with other plants by the soil and atmosphere, by the capture and consumption of insects and other small animals. The curious and varied mechanical arrangements by which these supplies of animal food are obtained, the ways and degrees in which they are utilized, and the remarkable chemical, histological, and electrical phenomena which accompany these processes of prehenson and utilization, can only be understood by a separate and somewhat detailed examination of the leading orders and genera.

The best known and most important order—the *Droseraceæ*—is placed among the calycifloral exogens, and has obvious affinities with the *Saxifragaceæ*. It includes six genera—*Byblis*, *Roridula*, *Drosera*, *Drosophyllum*, *Aldrovanda*, and *Dionæa*, of which the last three are monotypic, *i.e.*, includes only one species. The curious pitcher-plant, *Cephalotus follicularis*, is usually raised to the dignity of a separate natural order *Cephaloteæ*, though Bentham and Hooker *(Gen. Plant.)* place it among the *Ribesiaceæ*. The *Sarraceniaceæ* are thalamiflorals, and contain the genera *Sarracenia*, *Darlingtonia*, *Heliamphora*, while the true pitcher-plants or *Nepenthaceæ*, consisting of the single large genus *Nepenthes*, are placed near the *Aristolochiaceæ* among the *Apetalæ*. Finally the genera *Pinguicula*, *Utricularia*, *Genlisea*, and *Polypompholix* belong to the gamopetalous order *Utriculariæ*. Thus all the four leading divisions of the exogenous plants are represented by apparently unrelated orders ; certain affinities, however, are alleged between *Droseraceæ*, *Sarraceniaceæ*, and *Nepenthaceæ*.

While the large genus *Drosera* has an all but world-wide distribution, its congeners are restricted to well-defined and usually comparatively small areas. Thus *Drosophyllum* occurs only in Portugal and Morocco, *Byblis* in tropical Australia, and, although *Aldrovanda* is found in Queensland, in Bengal and in Europe, a wide distribution explained by its aquatic habit, *Dionæa* is restricted to a few localities in North and South Carolina, mainly around Wilmington. *Cephalotus* occurs only near Albany in Western Australia, *Heliamphora* on the Roraima Mountains in Venezuela, *Darlingtonia* on the Sierra Nevada of California, and these three genera too are as yet monotypic; of *Sarracenia*, however, there are six or eight known species scattered over the eastern States of North America. The thirty-six species of *Nepenthes* are mostly natives of the hotter parts of the Indian Archipelago, but a few range into Ceylon, Bengal, Cochin China, and some even occur in tropical Australia on the one hand, and in the Seychelles and Madagascar on the other. *Pinguicula* is abundant in the north temperate zone, and ranges down the Andes as far as Patagonia; the 150 species of *Utricularia* are mostly aquatic, and some are found in all save polar regions; their unimportant congeners, *Genlisea* and *Polypompholix*, occur in tropical America and south-western Australia respectively. It is remarkable that all the insectivorous plants agree in inhabiting damp heaths, bogs, marshes, and similar situations where water is abundant—a peculiarity perhaps due to their habit of copious secretion and consequent need of water.

The common Sundew (*D. rotundifolia*) has extremely small roots, and bears five or six radical leaves horizontally extended in a rosette around the flowerstalk. The upper surface of each leaf is covered with gland-bearing filaments or "tentacles," of which there are on an average about two hundred. Each gland is surrounded by a large dew-like drop of a viscid but transparent and glittering secretion, and the popular names (Sundew, French *Rossolis*, German *Sonnenthau*) as well as the Linnæan have been thus suggested.

Insects seem to be attracted by the leaves of *Drosera*, but whether by their color, their glittering secretion, their odor, or by all three, remains as yet unsettled. A fly alighting on the disk, or even only touching one or two of the exterior tentacles, is immediately entangled by the viscid secretion; the tentacles to which it is adhering begin to bend, and thus pass on their prey to the tentacles next succeeding them inward, and the insect is thus carried by a curious rolling movement to the center of the leaf. The tentacles on all sides become similarly inflected; the blade or the leaf may even become almost cup-shaped; and the insect, bathed in the abundant secretion, which soon closes up its tracheæ, is drowned in about a quarter of an hour. The leaves clasp also, but for a much shorter time, over inorganic bodies.

The bending of the tentacle takes place near its base, and may be excited (1) by repeated touches, although not by gusts of wind or drops of rain, thus saving the plant from much useless movement; (2) by contact with any solid, even though insoluble and of far greater minuteness than could be appreciated by our sense of touch—a morsel of human hair weighing only $\frac{1}{78740}$ of a grain, and this largely supported, too, by the viscid secretion, sufficing to induce movement; (3) by the absorption of a trace of certain fluids, mostly nitrogenous. During the inflection of the tentacle, and even before it touches the stimulating object, the secretion of the gland increases in quantity, and, instead of remaining neutral, becomes acid.

The stalk of a tentacle whose gland has been stimulated by repeated shocks, continuous pressure, or the absorption of any nitrogenous fluid, particularly a solution of ammoniac carbonate, shows a mottled appearance, and, when examined under the microscope, the formerly homogeneous fluid contents of constituent cells are seen to have separated into purple masses of constantly varying number, shape and size, suspended in a colorless fluid, and the layer of colorless circulating protoplasm which lines the cells thus becomes much more distincly visible. This process, which is termed by Darwin "aggregation of the protoplasm," commences in the glands and gradually travels down the tentacles, being temporarily arrested at each cell-wall. The process of redissolution of the protoplasm commences at the base of the tentacles and proceeds upward. Aggregation is a vital process: the cells must be alive, uninjured, and oxygenated; if they are crushed or treated with carbonic acid, the phenomenon does not take place. It is not necessarily related to inflection, for one may be induced without the other; it is totally unlike the "plasmolysis," or shrinking away of the protoplasm from the cell-wall, which takes place on treating a portion of vegetable tissue with any dense fluid, and which is simply due to exosmose; and it does not depend upon increased secretion. Darwin has also observed aggregation in the sensitive hairs of *Dionæa*, and in the roots of various plants; it seems indeed to be of wide distribution and profound importance in the physiology of the vegetable cell.

Dionæa Muscipula, L.—This plant, the well-known Venus' Fly-trap, was first described in 1768 by Ellis in a remarkable letter to Linnæus, in which he gave a substantially correct account of the structure and functions of its leaves, and even suggested the probability of their carnivorism. Linnæus declared it the most wonderful of plants, yet only admitted that it showed an extreme case of sensitiveness, supposing that the insects were only accidentally captured and subsequently allowed to escape. Two American botanists, Curtis and Canby, successively advanced our knowledge of the mode of capture and digestion, which has only been investigated by Mrs. Treat, T. A. G. Balfour and others, and most fully by Darwin.

The leaves are all radical, with broad foliaceous footstalks. Each leaf has two lobes, standing at rather less than a right angle to each other, their edges being produced into spike-like processes. The upper surface of each lobe is covered with minute circular sessile glands, each consisting of from twenty to thirty cells filled with purplish fluid. It bears also three fine-pointed sensitive filaments arranged in a triangle. These contain no fibro-vascular bundles, but present an articulation near their bases, which enables them to bend parallel to the surface of the leaf when the lobes close. When the filaments are touched by an insect, the lobes close very sharply upon the hinge-like mid-rib, the spikes interlock, and the insect is imprisoned. If very minute and so not worth digesting, it is able to escape between the interlocked spines; more usually, however, it is retained between the lobes, which gradually but firmly compress it, until its form is distinguishable from without. The leaf thus forms itself into a temporary stomach, and the glands hitherto dry commence, as soon as excited by the absorption of a trace of nitrogenous matter, to pour out an acid secretion containing a ferment, which rapidly dissolves the soft parts of the insect. This is produced in such abundance that, when Darwin made a small opening at the base of one lobe of a leaf which had closed over a large crushed fly, the secretion continued to run down the footstalk during the whole time—nine days—during which the plant was kept under observation. Aggregation may be observed in the glands, and, at least on treatment with carbonate of ammonia, the aggregative process may be watched ascending the sensitive hairs.

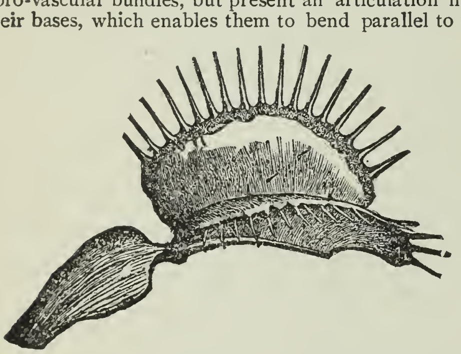


Fig. 1.—Leaf of Venus' Fly-trap (*Dionæa muscipula*), viewed laterally in its expanded state. (After Darwin.)

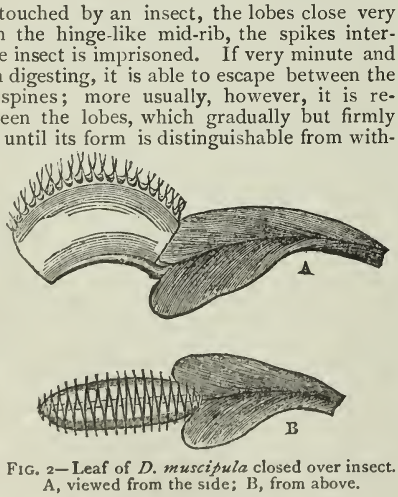


Fig. 2—Leaf of *D. muscipula* closed over insect. A, viewed from the side; B, from above.

Drosophyllum lusitanicum.—This plant catches such vast numbers of flies in a state of nature that the Portuguese cottagers call it the fly-catcher, and hang up branches of it in their houses for this purpose. Its linear leaves are thickly covered with stalked glands which resemble in the main the tentacles of *Drosera*, save in that they are incapable of movement, and that their secretion is acid before excitement. The secretion too is less viscid, and freely leaves the gland to wet the insect, which, creeping onward, soon clogs its wings and dies. There are, moreover, many minute, colorless sessile glands which only begin to secrete when stimulated by the absorption of nitrogenous matter, with which they seem to be mainly concerned.

Sarracenia.—Long supposed to be reservoirs of water for the birds, as was suggested by Linnæus, or refuges for insects from their pursuers, as was supposed by Catesby, the true function of the leaves of this curious plant has only been elucidated of recent years, mainly by the labors of Mellichamp and Hooker. The mouths of the long radical trumpet-shaped leaves are protected by a large spreading lid, the inner surface of which is abundantly smeared with nectar, and often gayly colored. Into one form of pitcher rain enters easily, into the other with difficulty. This with the mouth of the pitcher is furnished with numerous honey-secreting glands, and furnishes the attractive surface. A pathway, too, leads upward from the ground along the broad wing of the pitcher, and is at least in some species also honey-baited; along this creeping insects are lured to their destruction. Below it is the conducting surface of glassy epidermic cells, with short, downward-directed points, which like those of *Genlisea* facilitate the descent, but impede the ascent of an insect. Then comes the glandular surface, which is formed of smooth, polished epidermis with numerous glands, that secrete the fluid contents of the pitcher, and finally the detentive surface, of which the cells are produced into long and strong bristles which point downward and meet in the center of the diminishing cavity so as to render escape impossible. The secretion wets an insect very rapidly, and appears to have remarkable anæsthetic effects. It seems to be completely destitute of digestive power, indeed rather to accelerate decomposition. The pitchers accumulate vast quantities of insects in the course of a season, and must thus abundantly manure the surrounding soil when they die. Moreover, the feast is largely shared by unbidden guests (commensals). Not to speak of insects which feed upon the pitcher itself, some drop their eggs into the putrescent mass, where their larvæ find abundant nourishment, while birds often slit open the pitchers with their beaks and devour the maggots in their turn.

When Mr. Darwin's work appeared, numerous objections were made to accepting his conclusions, on the *a priori* ground that digestion was too purely an animal function to be conceivable of plants. Morren demolished these by showing that digestion—the conversion of insoluble and indiffusible proteids, fats, and amyloids into soluble and diffusible compounds by means of appropriate ferments—is not confined either to animals or to carnivorous plants, but is a universal property of living beings, in fact the necessary preliminary of all assimilation. Not only are all the important animal digestive ferments represented among plants, but vegetable physiologists have made us acquainted with several ferments—synaptase, erythrozyme, myrosine, etc.—which have no known analogues in the animal kingdom. It is merely the exudation, not the existence, of the ferment, then, which is remarkable in carnivorous plants, and this Darwin suggests might begin by an exosmose accompanying the absorption of animal matter by any plant possessing viscid glandular hairs, and, once set up, would be perfected by natural selection. Insectivorous plants, too, are not the only ones which exhibit peculiarities of nutrition. The true parasites absorb the juices of the plants which they infest, and, not to mention the fungi, many of which subsist partly or wholly on animal matter, the phanerogamous saprophytes live by absorbing the partially decomposed materials of other plants; and from the absorption of vegetable to that of animal matter the transition is easy. The reciprocal case, too, occurs in the animal kingdom; animals possessing chlorophyll have been shown to nourish themselves like plants, without feeding, by decomposition of carbonic acid and the formation of starch in sunlight, and thus carnivorous plants—trespassers into the animal kingdom—are paralleled by vegetating animals. Thus, then, we have only to change our standpoint, and look, not at the anomalous plant or animal, but at the essentially similar cells, and the yet more essentially similar protoplasm of which both are composed, to see that their apparent anomalies are but additional proofs of the unity of nature.

INSECTS. The Insecta, or Insects, from the largest class of that division of the animal kingdom formerly called *Articulata*, but for which the more expressive term *Arthropoda* (joint-footed) is now more generally employed. This term includes, besides *Insecta*, the classes *Crustacea*, *Arachnida* and *Myriopoda*.

The chief diagnostic characters of an Insect, as combinedly distinguishing it from a Crustacean, an Arachnid, or a Myriopod, are as follows:—Legs usually (never more than) six in number; two antennæ; ordinarily two pairs of more or less membranous wings; head, thorax, and abdomen distinctly separated; respiration effected by means of internal tracheæ, which communicate with the air by lateral openings termed spiracles or stigmata, or by external plates or filaments (these ordinarily only in the preparatory conditions of aquatic forms), which absorb air and convey it to the tracheæ. A reference to the articles on the other classes of *Arthropoda* will indicate in what way these diagnostic points are modified in them.

As in all organized beings, the limits of the class are not strongly defined, for, although it is not difficult to indicate an insect, speaking broadly, there are certain small groups that do not satisfactorily fall into the class as limited by strongly marked lines of demarcation.

At the head of this article it is stated that the *Insecta* form the largest group of the *Arthropoda*; it might probably be said with justice that they far outnumber all the other members of the animal kingdom combined. It is certain that at the present time 80,000 presumably distinct species of beetles have been described, and it is safe to assume that the number of known species of other orders is greater, thus giving a total of about 200,000. And yet we are only on the threshold of a knowledge of the forms that actually exist in nature, many enormous groups of minute forms being still only very partially studied. In fact, it may be confidently anticipated that some day the number of known forms will not fall far short of 1,000,000.

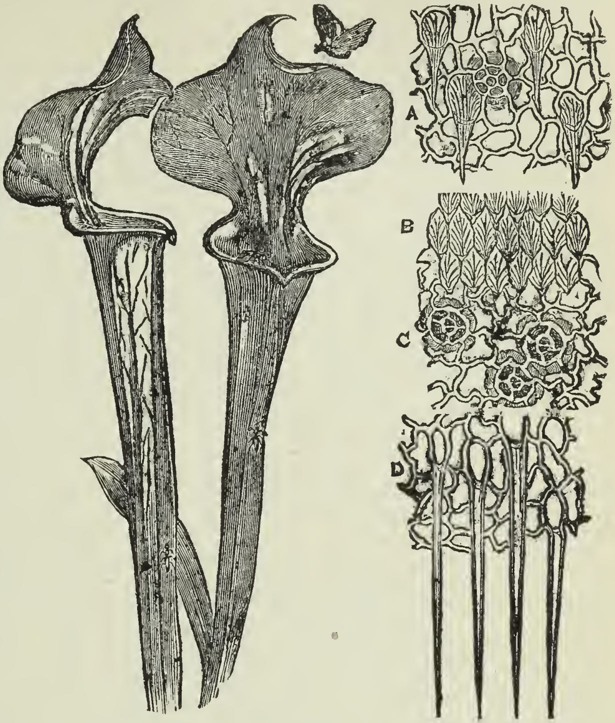


FIG. 3.—Leaves of *Sarracenia purpurea*. A, attractive surface of lid; B, conducting, C, glandular, and D, detentive surface; magnified. A and D are taken from *S. flava*.

Fossil indications of insects have been discovered in the Devonian series, and in the Carboniferous they become rather more numerous; but, with few exceptions, these all belong to those orders in which the metamorphoses are incomplete, and there is no evidence that any anthophilous insects (such as *Lepidoptera* or *Hymenoptera*) were then in existence. Ascending the geological scale to the Mesozoic age, the representatives of the older groups become very numerous, and often of gigantic size. *Coleoptera* are fairly well indicated; and the flower-loving *Lepidoptera* and *Hymenoptera* make their appearance, but in very small numbers. In the Tertiary rocks remains become sometimes very abundant, and of all orders; and in the post-Tertiary or Quaternary period these remains consist largely of those of species now existing. One of the most interesting features in fossil entomology is the well-known occurrence of myriads of insects entombed in the fossil resin known as amber, preserved in the most beautiful manner, and belonging for the most part to genera now existing, but differing specifically. In alluding to this it is well to mention that the insects found in gum copal and other recent resins are, on the contrary, of existing species. As in other animals, and also plants, the fossil remains prove that the distribution of heat and cold on the earth was once very different from what it is now: a fossil beetle of rather large size was discovered by our last Arctic Expedition almost at the highest northern point attained.

It may be asserted that no part of the earth's surface is without insects. They have been discovered in the Arctic and Antarctic regions at the highest point reached, and even showy butterflies of several species enliven the dreary solitudes of almost everlasting ice, as was abundantly proved by the naturalists of the *Alert* and *Disco* *ery*, who found them almost up to 83° N. latitude. But, as a rule, the larger and more brilliant forms occur within the tropics. Yet it must not be assumed, as is sometimes erroneously done, that the majority of tropical insects are large and brilliant, and the smaller and more obscure forms comparatively less numerous. Recent investigations by competent observers show that the latter are at least as abundant in the tropics as in temperate regions, and that it is the wealth of large forms that has caused the others to be overlooked.

The attempts at subdivision of the globe into zoölogical regions, so successful with regard to mammals, and in a smaller degree with birds, have not been so entirely satisfactory with regard to insects, more especially as concerns the separation of the Palæarctic and Nearctic regions; still there is often a very marked localization in particular groups, which divide themselves specifically to an infinite extent within very circumscribed areas, and are found nowhere else. The results obtained from minute investigation of insular faunæ have derived much of their value from insects, and have occasioned much valuable philosophical speculation on the origin both of the islands themselves and of their faunæ and floræ. Space will not permit of detailed allusion to the apparent affinity shown by the insect inhabitants of regions now very widely separated, such, for instance, as that of Western Europe, with Western (rather than Eastern) North America, of Australia and New Zealand with Chili, of Chili and the southern extremity of South America with the Palæarctic region, etc.

As special points of distribution may be mentioned the occurrence of insects in hot springs, in brine, in the deepest caves (these are usually blind), below low-water mark, and even on the surface of the ocean (the genus *Halobates* in the *Hemiptera*) very far from land.

The power of many insects to acclimatize themselves rapidly when accidentally introduced into new regions is very marked, and adds to the difficulty often experienced in considering what species are really endemic and what introduced, especially in islands. The maximum duration of the life of a perfect insect is probably attained in bees and ants, the females or queens of which are known to live at least seven years; the minimum is found in some species of May-flies (*Ephemeridæ*), in which twenty-four hours is perhaps the limit. But the length of life of a perfect insect is sometimes in direct opposition to that of the same insect in its preparatory stages, and some of the *Ephemeridæ* that live at most but a few days in their aërial form have taken three years to complete their growth in their sub-aquatic stages. Temperature also has a marked effect on some species. The common house-fly, for instance, will complete its whole life cycle from embryo to fly in a few days in the heat of summer, but requires very much longer in cold weather.

Among insects that are of direct benefit to man, the hive-bee and the silkworm moth stand preëminent, and the cochineal and lac insects are scarcely of less importance. No substitutes for silk, honey, and bees-wax have been or are likely to be discovered; but, on the other hand, chemical discoveries have now occasioned the disuse of some insect products that were formerly valuable articles of commerce, and in this category nothing is more remarkable than the manner in which the oak-gall of commerce has given way to inorganic substances in the manufacture of ink. As food for man, insects play a very unimportant part, and they can scarcely be said now to form part of the diet of the more highly civilized races, notwithstanding an attempt lately made in America so to utilize the masses of the destructive Rocky Mountain locust. Yet locusts themselves (with other large insects) are eaten raw or cooked by the inhabitants of more than one part of the globe, and, the large fleshy grubs or larvæ of beetles and other insects are as much esteemed as delicacies by the natives of some countries as the *Cossus* (the precise identity of which appears involved in some uncertainty) was by the luxurious Romans. The aborigines of Australia make a cake of the pounded bodies of a night-flying moth (*Noctua spini*), termed the Bugong moth; the natives of the Lake region of Central Africa make a kind of bread of the multitudes of small dead insects (chiefly *Ephemeridæ* and *Diptera*) that collect on the shores; in Central America the eggs of a large water-bug supply materials for a kind of bread.

Noxious insects are legion, and cannot be here alluded to even in the most general manner. The number of those that cause injury to man by direct attacks is comparatively small; it is by their attacks on the produce of our fields and gardens that insects assert their importance. But it should not be overlooked that the especial province of insects is to act as scavengers, and very frequently they are not the initiating cause of damage, which is rather to be sought in a previously unhealthy condition of the trees or plants; they simply step in to complete the work of destruction commenced by disease or by a low state of the vital functions.

That the action of insects in fertilizing plants was often necessary had long been known. But it is owing to the patient and laborious researches of modern naturalists (among whom the names of Darwin, Hermann Müller, and Lubbock stand prominently forward) that the vast importance of the subject has come to be understood. They have proved incontestably that in a multitude of plants the condition of the reproductive organs is such that self-fertilization is impossible; but what is of greater importance is the proof afforded that, although many plants are perfectly capable of self-fertilization, the weight and number of the seeds or fruit are often vastly increased when cross-fertilization is affected, and that this is mainly done by the action of insects, the wind and other causes playing only a minor rôle. It may be truly said that such is the correlation between plants and insects that the majority of the former would more or less gradually disappear from the earth's surface were the latter to be destroyed. In New Zealand the red clover has been introduced and flourishes, but all hopes of spreading it there have to be abandoned; the plant never perfects its seeds, owing to the absence of humble-bees, which appear absolutely necessary for its fertilization.

Among the varied relations of insects to other classes of the animal kingdom and their mutual relations, no subject is more interesting than is that of parasitism. It occurs in almost all the orders, but in very different degrees. Whole groups are naturally epizoic, others entozoic, while a few (such as fleas and bedbugs) can scarcely be arranged in either of these divisions, inasmuch as, although in one sense epizoic, it appears probable that they may occasionally be able to go through the whole of their life cycle without contact with the animals to which they otherwise appear especially attached. As true epizoa the whole group of true lice, *Anoplura* (which are probably degraded *Hemiptera*), and bird lice (*Mallophaga*, a group of uncertain affinities) are especially familiar. These cannot exist without their hosts, and their whole life is passed on them, each mammal or bird having its especial parasite (or more than one), which affects it only, or is at any rate confined to it and allied species. Such also are certain degraded forms of *Diptera*, including the bat parasites (*Nycteribia*), the bird flies (*Ornithomyia*), and others. Such also is a curious creature (*Platypsylla*) parasitic upon the beaver, the affinities of which are so little marked that it has been formed into a distinct order (*Achreioptera*) by Westwood, placed in the *Hemiptera* by Ritsema, and declared to be a true beetle by Leconte. Such also is a curious little moth (*Epipyrops*, Westwood), an external parasite upon certain homopterous insects; another moth (*Tinea vastella*) lives in its larval state on the horns of living animals; and many others might be cited.

As entozoic insects, the large dipterous family *Œstridæ* is especially characteristic, all its members living at the expense of *Mammalia* in very varied manners, the stomach, throat, frontal air passages, the subcutaneous system, and even the genital organs being attacked by various winged species, but only as larvæ, the perfect insects being winged and strong flyers. Furthermore, a genus of *Diptera* (*Batrachomyia*) belonging to quite another family (*Mucidæ*) is said to attack frogs. It is scarcely just, however, to class as true parasites certain insects whose larvæ have been discharged (still living) from the nostrils, intestines, or urethra of man. Many such cases have been perfectly authenticated, but the insects have been such as certainly do not of necessity require such conditions, and these latter are not natural habitats. Accident introduced them, and they were fitted to exist, at any rate for short periods, in the interior of the human body. But the largest class of insect parasitism is that which exists between insects themselves, as exhibited in an enormous number of families (*Ichneumonidæ*, *Evaniidæ*, *Proctotrypidæ*, *Chalcididæ*, etc.) of *Hymenoptera*, etc. These are essentially parasitic in their preparatory stages, and the parasitism is of the class that may be termed entozoic. The eggs are laid either in or on the bodies of the larvæ (chiefly) of other insects, and even in the eggs, the young larvæ of the parasites feeding mostly on the adipose tissue of their hosts, often enabling the latter to undergo most of their transformations (but very rarely that to the perfect insect). To such a class belong also many dipterous insects chiefly belonging to the *Tachinidæ*. Hyper-parasitism exists in many minute species of *Chalcididæ*, which do not directly affect the hosts themselves, but which feed in the bodies of other parasites.

Luminosity is another subject which should have more than passing notice bestowed upon it. Modern scientific travelers have not succeeded in confirming Madame Merian's well-known statements with regard to the luminosity of the so-called lantern-flies (*Fulgora*), hence these have to be eliminated from the category of luminous insects. It is among the *Coleoptera* that the phenomenon especially occurs, and in them is almost confined to certain skip-jack beetles (the genus *Pyrophorus*), and probably the entire family of glow-worms (*Lampyridæ*). The luminosity is confined to certain distinct patches, differing in position and number according to the species and also according to sex—usually most observable in the female, although this does not appear to be always the case. The property is distinctly under the control of the insect, and is often exercised in an intermittent manner at stated intervals, when the insects are not under the influence of extraordinary excitement. It is probable that luminosity exists in some *Diptera*, and also in the larvæ of certain exotic *Lepidoptera*, a recent traveler having assured us that in South America a larva of this order has luminous patches along either side, so that when in motion it has been compared to a lighted-up railway train. Some occasional instances of luminosity appear to be accidental, probably owing to the insects having been feeding upon, or otherwise in contact with, decaying phosphorescent matter. With regard to the nature of the luminous substance no very precise results have been arrived at by investigators. That it is phosphorous in some form or other appears certain, and the latest experimenter (Jousset de Bellesme) asserts as his belief that it is no other than phosphoretted hydrogen gas stored up in the cellular tissue, and in direct communication with the nervous and respiratory systems.

Galls are occasioned by the presence of the larvæ of certain species in nearly all orders of true insects, though it is among the *Cynipidæ* in *Hymenoptera* and the *Cecidomyiidæ* in *Diptera* that they are most characteristic. And they may be in almost any position on a plant, according to the species of gall-maker. The most striking, however, are clearly modified leaf or flower buds. The mystery surrounding galls is their cause. The indirect cause is the puncture of the insect, and the presence of its eggs or larvæ, but no explanation has been offered of the reason why this presence sets up the growth termed a gall. Two insects of differing species will deposit their eggs in the same position; in the one case no abnormal growth follows; in the other some peculiar irritation sets up a tumor, often enormous in size. Two insects, also of different species, but both gall-makers, do the same; in both cases a tumor ensues, but its form is totally different in the two. A most noticeable recent discovery is that by Doctor Adler (since confirmed by others) to the effect that in certain European *Cynipidæ* dimorphism to a remarkable extent occurs, and that certain genera are only conditions of others, the two forms of insects, and the totally different galls occasioned by them, being alternate in appearance.

Taking any large insect, we recognize in it three more or less distinctly separated divisions, the head, thorax, and abdomen. Taking the majority of insects, and especially of their larvæ, we recognize thirteen segments or somites, counting the head as one, the thorax as consisting of three, and the abdomen as nine. From a classificatory point of view, it is probably convenient to retain this idea, though in the abdomen of a dragonfly (for instance) there are ten quite distinct segments But, seen in the light of embryology and morphology, a different aspect is put on. The abdomen in the embryo of some insects clearly consists of eleven segments. Moreover, if each appendage of the head be considered as a modified limb, we get in some insects as many as seven segments in this portion of the body alone. Thus, although thirteen segments is a usual and convenient number as regards the structure of an insect, this number must be vastly increased if we consider the animal in regard to other divisions of the Arthropod series. In the abdomen the actual number is sometimes very much reduced, owing to several of the segments becoming obsolescent, coalescent, or retracted.

Respiration by tracheæ is one of the main characteristics of an insect. Tracheæ are tubes ramifying in the interior of the body, the walls of which are composed of two membranes with a spiral thread between, and extending into the wings and other appendages; but in the perfect insect the main tracheæ are subject to modification, and are more or less expanded into vesicles to suit the requirements of creatures with great powers of flight, or of strong movement in other ways. The manner in which air is communicated to these tracheæ, in order that the necessary oxygen may be obtained from it, is twofold in its nature. In insects that live in free air the latter is received through lateral openings termed spiracles or stigmata, which vary in number in different insects, but there is usually one on each side of most of the segments. A spiracle usually consists of a longitudinal slit in a membrane, protected by delicate mechanism, and also by special muscles, which can close it hermetically if necessary. Many aquatic insects also breathe through spiracles, and in these cases a quantity of air is collected (or entangled) in delicate pubescence on the surface of the body, the insect coming to the surface to obtain a fresh supply at intervals. But in the majority of aquatic insects, and especially of their larvæ or pupæ, air is obtained by means of external threads or plates, expansions of the integument, the function of which is to absorb air from water and convey it to the tracheæ by means of delicate ramifications of the tracheal system in their substance.

The food of insects is either solid or liquid, and the parts of the mouth are modified, according to requirements, into two main conditions, termed mandibulate and haustellate; but the latter term is somewhat vague, inasmuch as the modifications are by no means homologous in all haustellate insects, although the structure is subservient to the same function. Again, in both divisions the food may be either vegetable or animal in its nature, and according as this may be the parts of the digestive system are modified.

In all insects the sexes are separate. True hermaphrodites do not exist, though individual monstrosities, in which the form, coloration, and even internal organization of both sexes are combined, are not rare. The external organs are placed at or near the extremity of the abdomen, and are usually accompanied by secondary or accessory appendages often of most complex structure, serving to insure complete contact during the sexual act, and probably also to some extent excitatory. In the dragon-flies, however, the intromittent organ of the male is in the under side of the second abdominal segment, which explains the extraordinary position of the sexes when coupled.

There are certain anomalous conditions of the generative system that may be conveniently noticed here, under different headings.

In bees, wasps, and ants, and also in *Termes* (or white ants), the majority of the members of a colony is made up of individuals which as a rule have no reproductive powers. In the first three, these are aborted females, and it has been proved (at any rate for ants) that occasionally these workers lay eggs, which, however, always produce males, the production of a queen depending apparently upon special feeding in the larval stage. In *Termes* the conditions are different. There are both workers and soldiers, both incapable of reproduction, but not exclusively consisting of aborted females, since both sexes are represented. Also in *Termes* there are what have been termed complementary males and females, distinct from the pair that were once supposed to be the exclusive founders of a new colony; of these the females lay comparatively few eggs, their ovaries not acquiring the extraordinary development of those of the true queen.

Oviparous generation is the rule in insects; but there are certain departures from the rule. In the *Aphides* it is well known that both the oviparous and viviparous exist in the same species.

Metamorphoses.—All true insects may be said to undergo a metamorphosis. Such a condition is absent in the small groups known as *Thysanura* and *Collembola.* Metamorphosis may be broadly grouped into two main divisions—(1) that in which the larva changes into a pupa which, as a rule, is inactive, and which never eats, and (2) that in which there is no true pupa state, the animal continuing active, and eating, from the egg to the perfect insect. In the former the larva changes its skin, or molts, several (often many) times before it changes to the pupa, the last molt (or ecdysis) happening when it is in what may be called the pseudo-pupal condition (which may last from a few hours to several months) immediately before the pupa state is assumed; this division is usually characterized as "metabolic." In the latter ecdysis goes on continuously at intervals from the egg to the winged insect, and the form of the larval condition much resembles that of the perfect, the wings budding out gradually as the creature approaches maturity; the term "hemimetabolic" is applied to this division. In the first division the conditions are rather more varied than in the second. In the pupa of some *Diptera* the larval skin hardens, and within this the true pupa is formed (such a pupa is termed "coarctate"); in other *Diptera* the pupa is not contained within the larval skin (which much resembles a true cocoon), but is free and even sometimes active, the various appendages not being connected with the body, as is usually the case in that of a lepidopterous insect. The pupæ of *Hymenoptera* and *Coleoptera* are also much in the same condition, but they are not strictly active. Many writers have attempted to draw a broad distinction between such a pupa as that of a moth and that of an ant-lion or caddis-fly, cited here as extremes, because in the latter the members are free, and pupa is really active shortly before the change into the perfect state, and thus the metamorphosis is supposed to be in some respects intermediate between that of true *Metabola* and true *Hemimetabola.* But such distinctions are more apparent than real. In many of the small moths the limbs and other appendages are scarcely consolidated with the body, but simply concealed in sheaths of which the ends at any rate are free. Also in the second (or hemimetabolic) division distinction has been drawn between the larva of a May-fly and that of a bug (as instances), because the changes from an absolutely apterous condition to one in which the wings are rudimentary and from this to the perfect state are more marked in the latter. This is probably due to the number of molts being less; the form with rudimentary wings is in no way a true pupa.

INSPIRATION is a word of Latin origin, and is used to express the fact that holy men of old spake as they were moved by the Spirit of God. The idea is not exclusively Christian or Jewish; pagans have had their inspired speakers and writers and their ideas of inspiration, and these earlier pagan notions have had their effect on some of the forms which the Christian doctrine has assumed. The classical languages contain many words and phrases expressive of this idea. Artistic powers and poetic talents, gifts of prediction, the warmth of love and the battle frenzy were all ascribed to the power of the god possessing the man inspired. These words were taken over into Christian theological writing, and used to describe what Jewish and Christian divines have called inspiration. This transference of terms, which was unavoidable, produced, however, a certain confusion of thought; for pagans and Christians meant by inspiration two different things. When a pagan described inspiration, he did so by stating the marks of the state into which the inspired person fell when the fit seized him; a Christian theologian on the other hand was chiefly concerned with the result of inspiration. What the inspired person said or did or commanded was of less moment to the pagan philosopher than the fact that he was possessed, that he was passive in the hands of the inspiring deity, that he was no longer himself but the god who for the moment dwelt in him and used him as he might an inanimate instrument. But in Christian theology inspiration always has to do with the belief that God has "wholly committed to writing" His revelation, and the psychological character of the state of inspiration is of small account compared with the fact that inspiration, whatever it may be, has for its result that God's revelation has so been committed to writing that men have it permanently, fully, and in an infallibly trustworthy way. The doctrine of inspiration in Christian theology contains very little reference to the psychological state of the persons inspired, and when it does enter into such details we may generally trace their presence back to the influence of pagan ideas or words; it has to do with the characteristics of the writings which have been inspired. In short, the problem of inspiration in Christian theology very much comes to this:—In the Bible we have God's revelation wholly committed to writing; what are we to infer from this about the Bible? And the varying answers given to this question form the history of the doctrine. Theology distinguishes between revelation, inspiration and the canon of Scripture. Revelation is the objective approach of God to man, God entering into human life and history for man's salvation; Scripture is the record of this revelation, and inspiration provides that the record is complete and trustworthy; while the canon of Scripture gives the list of inspired writings.

Our knowledge of the opinions of ancient Jewish thinkers about inspiration comes chiefly from the Apocrypha, from Josephus, and from Philo Judæus. The writers of the Apocrypha do not give us any theory or doctrine of inspiration, but it may be easily gathered from what they say that they regarded the Scriptures of the Old Testament as the word of God, and therefore worthy of all reverence. It is in I Macc. xii. 9, that the expression, "the sacred books," is first used of Old Testament books; and it is evident that the Pentateuch or the books of the law were held in special reverence, but beyond this we do not find a doctrine of inspiration. Nor does Josephus formally state or discuss the dogma in his writings, but his language shows that he and his contemporaries believed that the Old Testament Scriptures were the work of God. The Old Testament he calls prophecy, and he declares that down to the time of Artaxerxes there was a regular succession of prophets which since then has ceased. It is Philo who first seeks to give a theory of inspiration, and he does so by bringing the reflections of Plato upon the pagan inspiration to explain the Jewish doctrine. Following Plato, Philo says that inspiration is a kind of "ecstasy," and he seems to imply that the degree of inspiration is greater in proportion to the unconsciousness or at least to the passivity of the man inspired. The prophet, he says, does not speak any words of his own; he is only the instrument of God, who inspires and who speaks through him, but he says that there are degrees of inspiration, and that all portions of Scripture are not equally inspired, or at least have not the same depth of inspiration.

The early Christian church seems to have simply taken over the Jewish views about the inspiration of the Old Testament; and, when the New Testament canon was complete, they transferred the same characteristics to the New Testament writings also. It is evident that the early fathers of the church wished to teach that the complete knowledge of the salvation of God revealed in Christ was to be found in the Holy Scriptures because they were the book of God, but it is difficult to gather any consistent doctrine of inspiration from their writings, and when they do speak of inspiration it seems as if they were thinking more of the psychological process going on in the mind of the inspired man than of the result in the character of an inspired book. It was perhaps difficult for men educated in the principles of heathen philosophy to avoid applying their early belief about the pagan *mania* to explain or define the Christian idea of inspiration. At all events we find the doctrine of inspiration described under such metaphors as the Platonists were accustomed to use; the inspired writer was the lyre, and the Holy Spirit the plectrum; the writer was the vase, and the Spirit filled it; and Montanus could appeal to the almost unanimous idea of the church that prophecy implied both passivity and ecstasy.

The schoolmen accepted the doctrine of inspiration as it came to them from the fathers, and methodized it. They held that the Bible, which was the word of God and therefore inspired, was the source of doctrinal truth; and so this inspiration of the Bible came out in the fact that the doctrinal truths contained in it were infallibly true. The schoolmen also recognized that a revelation which is primarily doctrinal, and that only, requires infallibility in interpretation as well as infallibility in delivery; and so the inspiration of the church was as important as the infallibility of Scripture. As time went on the infallible interpretations were collected, and side by side with an infallible Scripture was the infallible tradition or the official interpretation of Scripture. The logical schoolmen, however, perceived, what was not so distinct to the fathers of the church, who were accustomed to think in pictures rather than in propositions, that if the Bible was altogether a communication of doctrinal truth there was much in the Scriptures which had not at first sight that appearance. The long histories, the tables of genealogy, did not contain doctrinal statements, or give rules of holy living. Were these portions inspired? The question does not require to be raised if we believe that inspiration implies simply that God has fully committed His revelation to writing, and that revelation is above all things God entering into human life and history for the salvation of his people, for then the whole course of the history, with all the facts as well as the doctrines, contains the revelation. But if we take revelation to be only the delivery of doctrines, the question arises and disturbs our theory of inspiration. The fathers solved every difficulty here by appealing to allegorical interpretation, for allegory will turn the driest statistical details into a moral or doctrinal code; but the schoolmen were too dryly logical to be quite content with this explanation. They accepted the allegorical senses of Scripture, but many of them held, like Thomas Aquinas, that there were two kinds of inspiration in Scripture, the *direct*, which is to be found where doctrinal and moral truths are directly taught, and the *indirect*, which appears in historical passages, whence the doctrinal and moral can only be indirectly evolved by the use of allegorical interpretation.

The reformers placed the authority of Scripture above the decrees of popes and councils, above the opinions of the fathers, above the whole digest of official interpretations of Scripture which made tradition. They regarded Scripture as the judge in all controversies in matters of faith and doctrine, and as the source whence came every article of belief; but, besides this, they held that Scripture was a means of grace, a principle of salvation, a means of awakening the new life in the hearts of God's people. This was the real gist of the Reformation doctrine of Scripture; this was the main part in the contribution which the reformers made to the doctrine of the word of God. The fathers had spoken of the practical importance of Scripture and its power for edification, but they had placed these qualities in a secondary position, and in the scholastic period Scripture came to be regarded as little more than a quarry for doctrines. The reformers insisted that all doctrines must come from Scripture; they held that the Scripture was the book of the all-wise God, and was therefore the touchstone in matters of religious controversy; but they also held that above all the Scripture was the sword of the Spirit, and that its main use was to pierce the heart and conscience. According to the reformers, the revelation of God was fully committed to writing in the Scriptures, and the inspiration of Scripture lay in this fact; but they held that the special nature of inspiration must be derived from the purpose of God in this matter. God fully committed His revelation to writing, they argued, not merely to impart new knowledge to men, but also and principally to awaken His people to a new life; and this purpose must appear in the statement of the doctrine of inspiration. Thus the Reformation doctrine of inspiration, while capable of statement in terms somewhat similar, was really different from the patristic and mediæval theories, and it became more closely allied with the written Scriptures, and paid less attention to the writers. It taught that Scripture, as a whole, and the parts of Scripture looked at as parts of the one whole, were designed to be a means of grace, to awaken a new life in God's people, through the work of the Spirit, and thus the doctrine of inspiration was at once brought into connection with and yet clearly separated from the spiritual illumination shared by all believers. It is allied because both the inspiration of Scripture and the enlightening work of the Spirit in the hearts of believers are parts of the plan of God whereby by His means of grace through the work of the Spirit He gathers believers into His kingdom; it is quite distinct, for by it God wholly commits His revelation to writing, and so makes the Scripture able to appeal with the very power of God to the hearts and consciences of men. In this way the doctrine of inspiration was advanced a stage beyond what it had before reached, and indeed was raised to a higher platform. It was now seen that inspiration secured that the Scriptures should be instinct with God's power for salvation, as well as full of the knowledge which God has pleased to communicate to man. And thus in the hands of Luther, Calvin, and Zwingli the doctrine of inspiration had for its correlative the doctrine of *Testimonium Spiritus Sancti;* the two doctrines supported and explained each other. The second raised the first out of the region of mechanical dictation, the first prevented the second degenerating into a mystical enthusiasm. The reformers were content to leave the doctrine of inspiration without much further definition, but they took the full advantage of the spiritual form of the doctrine to use great freedom with the letter of Scripture. Their successors acted otherwise.

The Protestant scholastics for the most part treated the Reformers' doctrine of inspiration very much in the same way as the schoolmen had treated the doctrine of the fathers. They did not deny the spiritual side of the doctrine; they maintained that Scripture was a means of grace, a power of God to salvation; but they did not bring this side forward much in their discussions about inspiration. They dwelt on the fact that inspiration secured accuracy, rather than on the fact that it brought with it spiritual power. They asked, When Scripture is the word of the all-wise God, what does this imply? And the answers were various. Gerhard held that it implied that the writers were the "pens," the "hands," the "amanuenses" of the Holy Ghost. On the other hand, Cappellus, led by his investigations into the antiquity of the Hebrew points, maintained that the inspiration of Scripture did not necessarily demand perfect accuracy in details; and he declared such accuracy not only did not exist in such editions as we have now, but never did exist, for manuscripts show discrepancies which cannot be explained on the theory of willful or involuntary mistakes of copyists.

The Socinians and certain Arminians, such as Episcopius, who started with the idea that the Bible is simply a communication of knowledge, and so revived the mediæval idea, also resuscitated the scholastic doctrine of partial inspiration. They did not admit the allegorical method of interpretation, and were therefore compelled to reject the "indirect inspiration" of Thomas Aquinas; but they held that inspiration was only required to communicate knowledge which the writer could not otherwise obtain, and they usually asserted that only the doctrinal parts of the Bible were inspired while the historical were not. Calixtus in the Lutheran Church held a somewhat similar opinion.

In more recent times the doctrine of inspiration has assumed various forms, many of which have but slight connection with either the Reformation or the mediæval theories. All admit that the inspiration of Scripture implies that the revelation of God has been commited to writing.

INSTERBURG, the chief town of a circle in government district of Gumbinnen, East Prussia, is situated at the point where the Angerap and Inster join to form the Pregel, about fifty-five miles east of Königsberg. Population about 20,000.

INSTINCT is a term which does not admit of rigid definition, because, as ordinarily used, the meaning of the term is not rigidly fixed. But for the purposes of scientific exposition from a biological point of view the nearest approach we can make to such a definition is perhaps the following:—Instinct is a generic term comprising all those faculties of mind which lead to the conscious performance of actions that are adaptive in character, but pursued without necessary knowledge of the relation between the means employed and the ends attained. We must, however, remember that instinctive actions are very commonly tempered with what Pierre-Huber calls "a little dose of judgment or reason." But although reason may thus in varying degrees be blended with instinct, the distinction between the two is sufficiently precise; for reason, in whatever degree present, only acts upon a definite and often laboriously acquired knowledge of the relation between means and ends. Moreover, adjustive actions due to instinct are similarly performed by all individuals of a species under the stimulus supplied by the same appropriate circumstances, whereas adjustive actions due to reason are variously performed by different individuals. Lastly, instinctive actions are only performed under particular circumstances which have been frequently experienced during the life history of the species, whereas rational actions are performed under varied circumstances, and serve to meet novel exigencies which may never before have occurred even in the life history of the individual.

All instincts probably arose in one or other of two ways. (1) By the effects of habit in successive generations, mental activities which were originally intelligent become, as it were, stereotyped into permanent instincts. Just as in the lifetime of the individual adaptive actions which were originally intelligent may by frequent repetition become automatic, so in the lifetime of the species actions originally intelligent may, by frequent repetition and heredity, so write their effects on the nervous system that the latter is prepared, even before individual experience, to perform adaptive actions mechanically which in previous generations were performed intelligently. This mode of origin of instincts has been appropriately called the "lapsing of intelligence." (2) The other mode of origin consists in natural selection, or survival of the fittest, continuously preserving actions which, although never intelligent, yet happen to have been of benefit to the animals which first chanced to perform them. Thus, for instance, take the instinct of incubation. It is quite impossible that any animal can ever have kept its eggs warm with the intelligent purpose of hatching out their contents, so we can only suppose that the incubating instinct began by warm-blooded animals showing that kind of attention to their eggs which we find to be frequently shown by cold-blooded animals. Thus crabs and spiders carry about their eggs for the purpose of protecting them; and if, as animals gradually became warm-blooded, some species for this or for any other purpose adopted a similar habit, the imparting of heat would have become incidental to the carrying about of the eggs. Consequently, as the imparting of heat promoted the process of hatching, those individuals which most constantly cuddled or brooded over their eggs would, other things equal, have been most successful in rearing progeny; and so the incubating instinct would be developed without there having been any intelligence in the matter.

That many instincts must have been developed in this way is rendered evident by the following considerations. (1) Many instinctive actions are performed by animals too low in the scale to admit of our supposing that the adjustments which are now instinctive can ever have been intelligent. (2) Among the higher animals instinctive actions are performed at an age before intelligence, or power of learning by individual experience, has begun to assert itself. (3) Considering the great importance of instincts to species, we are prepared to expect that they must be in large part subject to the influence of natural selection. As Mr. Darwin observes, "it will be universally admitted that instincts are as important as corporeal structures for the welfare of each species under its present conditions of life. Under changed conditions of life it is at least possible that slight modifications of instinct might be profitable to a species; and if it can be shown that instincts do vary ever so little, then I can see no difficulty in natural selection preserving and continually accumulating variations of instinct to any extent that was profitable. It is thus, I believe, that all the most complex and wonderful instincts have originated."

But here it is of importance to note that there is no reason why instincts should be restricted to one or other of these two modes of origin. On the contrary there seems to be every reason to suppose that many instincts may have had, as it were, a double root—intelligent adjustment and natural selection blending their influences to joint production. For example, the grouse of North America display the curious instinct of burrowing a tunnel just below the surface of the snow. In the end of this tunnel they sleep securely; for, when any four-footed enemy approaches the mouth of the tunnel, the bird, in order to escape, has only to fly up through the thin covering of snow. Now in this case the grouse probably began to burrow for the sake of protection, or concealment, or both, and if so, thus far the burrowing was probably an act of intelligence. But the longer the tunnel, the better would it have served the purpose of escape; and therefore, natural selection would almost certainly have tended to preserve the birds which made the longest tunnels, until the utmost benefit that length of tunnel could give had been attained. And similarly the origin of many other instincts may be satisfactorily explained by thus supposing the combined operation of two causes—intelligent adjustment and natural selection —where there is a difficulty in explaining their origin as due to either cause alone. And if even in fully formed instincts we often find "a little dose of judgment or reason," we can have no cause to doubt that in the formation of instincts by natural selection, such small admixtures of judgment or reason may often greatly assist the process, while, conversely, it is even more evident that an instinct which is developing from the habitual performance of an intelligent action might be greatly assisted by natural selection favoring the individuals that most frequently or most promptly performed that action.

INSTITUTE OF FRANCE, an association constituted under the name of the *Institut National* by the French Republican Convention, in October, 1795, to occupy a similar position to that of the old academies suppressed by an act of the Convention, April 8, 1793. The affix to the word "Institut" has undergone a variety of changes corresponding to changes in the form of the government of France. The Institute owed its existence chiefly to the efforts of three persons, Lakanal, Daunou, and Carnot, and, according to the terms of the law by which it was founded, its purpose was to "advance the sciences and arts of research by the publication of discoveries and by correspondence with other learned societies, and to prosecute those scientific and literary labors which shall have for their end general utility and the glory of the republic." It was composed of three classes—the first for sciences physiques et mathématiques, the second for sciences morales et politiques, and the third for littérature et beaux-arts. Originally it consisted of one hundred and forty-four members (the forty-eight nominated by the Convention electing ninety-six others), an equal number of associates in the provinces, and twenty-four foreigners of distinction who held the position of correspondents. Each class was divided into several sections, six members and six associates being assigned to each section. The first class was composed of ten sections, viz., (1) mathématiques, (2) arts mécaniques, (3) astronomie, (4) physique expérimentale, (5) chymie, (6) histoire naturelle et minéralogie, (7) botanique et physique générale, (8) anatomie et zoölogie, (9) médecine et chirurgie, (10) économie rurale et art vétérinaire. The second class was composed of six sections, namely, (1) analyse des sensations et des idées, (2) morale, (3) science sociale et législation, (4) économie politique, (5) histoire, (6) géographie. The third class consisted of eight sections, viz., (1) grammaire, (2) langues anciennes, (3) poésie, (4) antiquités et monuments, (5) peinture, (6) sculpture, (7) architecture, (8) musique et déclamation. To the first class were thus assigned sixty members and as many associates, to the second thirty-six, and to the third forty-eight, the foreign correspondents being divided equally among the classes. No member was permitted to belong to more than one class; but any one might be present at the meetings and assist in the labors of the other classes. The Institute was installed at the Louvre in the building formerly occupied by the Académie Française, but in 1806 its locality was changed to the College des Quatre-Nations. The First Consul on January 23, 1803, decreed for it a new constitution, the leading features of which were—that the approval of the head of the government was essential in the election of members; the suppression of the second class; and a redivision into the four classes of (1) sciences physiques et mathématiques, (2) la langue et la littérature Françaises, and (3) histoire et littérature anciennes, (4) beaux-arts. The first class was composed of the ten sections of the old first class, and an additional section of geography and navigation with three members, with power to nominate one hundred correspondents. The second class was composed of forty members not separated into sections. The third class was composed of forty members and of eight foreign associates, and had the power to nominate sixty correspondents. The fourth class, which was composed of twenty-eight members and of eight foreign associates, was divided into five sections—peinture with ten members, sculpture with six, architecture with six, gravure with three, and musique (composition) with three members. It had the power to nominate thirty-six correspondents. All classes had power to elect a stipulated number of members from the other classes. After the Restoration Louis XVIII., on March 21, 1816, decreed the revival of the names of the old academies to the four classes of the Institute:—(1) L'Académie Française, corresponding to the old second class; (2) L'Académie royale des inscriptions et belles lettres, corresponding to the third class; (3) L'Académie royale des sciences, corresponding to the first class; and (4) L'Académie royale des beaux-arts, corresponding to the fourth class. On March 5, 1833, a fifth academy was added to the Institute—L'Académie des sciences morales et politiques, corresponding to the second class suppressed by Napoleon. As restored, it was composed of thirty members, with a minimum of thirty and a maximum of forty correspondents. It was divided into five sections, viz., (1) philosophie, (2) morale, (3) législation, droit public et jurisprudence, (4) économie politique et statistique, (5) histoire générale et philosophique.

INSURANCE is the system or machinery by which it is sought to guard against the pecuniary consequences of certain accidents to which men are liable, such as the loss of property by fire or shipwreck, or the loss of future earnings through disablement or premature death. Insurance does not attempt to prevent these accidents, nor even to protect men against all the consequences of them. It deals only with the main pecuniary loss which such accidents are fitted to occasion, provides for it beforehand, practically distributes it among the persons who are more or less exposed to the same risk; and so, when the accident does light on any one of them, its pecuniary effects are neutralized or greatly mitigated. The three chief developments of this system—Fire, Life and Marine Insurance—are separately treated in the following articles. A very important application of the principle has been treated under the heading FRIENDLY SOCIETIES.

Besides the above branches of insurance, which have attained immense proportions in almost all civilized countries, there are many other applications of the principle which have been tried with greater or less success. The conditions which seem necessary to success (in addition to good administration) are chiefly these:—There must be a risk of real loss which it ought to be beyond the power of either the insurer or the insured to avert or to hasten; a large number of persons must be liable to the like risk; the accident contemplated must be likely to fall on a comparatively small number of the persons exposed to the risk of it; the probabilities of its occurrence must be capable of being estimated beforehand with some approximation to certainty; the loss apprehended must be so considerable when it does occur as to be worth providing against; and the cost of that provision must be comparatively so small as not to be prohibitive.

Ordinary life insurance protects against the pecuniary loss arising to a man's family or creditors or others by his death, whether that arise from accident or disease; but it has been found that a separate insurance against the consequences of accident meets the requirements of a large class of persons. A company was established in London in 1849 for insuring against the consequences of railway accidents—the Railway Passengers' Insurance Company. Many other similar companies have since been established, and at the present time (1890) there are several such offices in Great Britain.

The business of insuring against accidents has been developed in Canada, Victoria, and New South Wales, as well as in France, Germany, Switzerland, and the United States. In this country the premium income of the principal office engaged in this business was, in 1889, over $1,000,000.

The guarantee of employers against the fraud or insolvency of their servants has of late years become a considerable and useful department of insurance business. Private suretyship is attended by many evils, and a bond of indemnity by a joint-stock company, although it has to be purchased by a yearly payment, is now generally preferred. Such a bond is not granted without previous inquiry as to the character of the applicant and the checks which the employer is to use.

In those parts of the United States and elsewhere which are exposed to violent hailstorms offices have been established successfully for insurance against the loss which these often occasion. Efforts have been made also, not always with equal success, to protect farmers and other owners of horses and cattle against the loss arising from accident or disease among these animals. It has been attempted also to insure traders against the loss from bad debts, and house-owners against loss of rent and against defective titles.

Fire insurance is a matter of practical interest to a far larger number of persons than either of the other two great departments of insurance—life or marine. There are few persons to whom, in the absence of insurance, the destruction of their dwellings or of their household goods would not be a serious calamity, while to the merchant or manufacturer the burning of his premises or stock or machinery might be ruinous. No age or country has been exempt from such fatalities, and no watchfulness has been able to prevent them. Some protection against the pecuniary consequences seems an essential condition of any extended system of manufactures or commerce.

Fire insurance, however, as an organized system, has an origin comparatively recent. There are traces, indeed, in earlier times of forced or voluntary contributions toward the relief of sufferers by fire, but it is only about the beginning of the seventeenth century that we hear of proposals being made for a more systematic provision, and it was not till after the great fire of London in 1666 that these proposals took practical shape. This seems at first to have been in the form of underwriting by individuals or by clubs, and some attempts were made to engage the corporation of London in a scheme of fire insurance; but in 1681 the first regular office for insuring against loss by fire was opened by a combination of persons "at the back-side of the Royal Exchange," and it was followed shortly afterward by another. Of the insurance offices that still survive, only one, the Hand-in-Hand, dates from the seventeenth century (1696); five date from the first half of the eighteenth century, the Sun (1710), Union (1714), Westminster (1717), London (1720), and Royal Exchange (1720); while only three date from the second half of that century, the Salop (1780), Phœnix (1782), and Norwich Union (1797). The first fire office in Scotland was established in 1720, the first in Germany in 1750, and the first proprietary company in that country in 1779; the first office in the United States was established at Philadelphia in 1752, one of its early directors having been Benjamin Franklin; the first in France dates from 1816, and the first in Russia from 1827.

Fire insurance as a business consists in undertaking a certain risk more or less considerable in amount, in return for a comparatively small sum, received beforehand, called the premium. While the amount of risk undertaken is strictly limited to the sum insured, the degree of risk is an element extremely difficult to measure, and liable to much fluctuation. Whether of ten thousand houses or shops, or stores, or factories, ten or a hundred will be more or less injured every year by fire is a matter partly of experience, but partly also of conjecture and, as we say, of chance. Assuming that the proportion would always be the same under precisely the same circumstances, not perhaps every year but on an average of years, the questions remain whether the circumstances will always be the same, and whether, if they be, the one thousand cases on which we have made our own calculations are a sufficient basis for dealing with ten thousand cases. The slightest observation reveals an endless diversity in the risks undertaken, and, even if an absolute law could be reckoned on, the risks would require careful and accurate classification before the law could be deduced. But, in point of fact, the risks are always changing. If we take what from an insurance point of view is the simplest and safest "risk," a private dwelling house in a large town, the question suggests itself:—How has this risk been affected by the age of the building, the character of the occupants, the introduction of gas or paraffine or lucifer matches, by the proximity of more dangerous property, and by the improvement or deterioration in the public supply of water and the public arrangements for extinguishing fires? Infinitely greater changes take place in the degree of risk attending warehouses and manufactories, and many of these developments are of an unexpected character. The great fire in Tooley street, London, in 1861, was aggravated by a prodigious escape of burning tallow, which literally set the Thames on fire, and long defied all efforts to extinguish it. More lately at Leith a highly inflammable spirit recently introduced into trade exhibited similar characteristics. At Newcastle a fusion of nitrates of soda or potash mixed with burning timbers caused a prodigious aggravation of a fire; and at Glasgow and elsewhere the fine flour dust of a corn mill, when mixed with a certain quantity of atmospheric air, was unexpectedly found to be as explosive as gunpowder.

But the speculative hazard of fire insurance as a commercial enterprise is limited by a very important circumstance. The contracts, in the United Kingdom at least, are seldom made for a longer period than one year, and often for less, and need not be renewed on either side unless their safety and reasonableness are confirmed by experience, so that from day to day the insurance company is able in a measure to revise its terms, and to correct the errors arising from imperfect data or a too sanguine generalization. The business on the whole has been a profitable one. The conditions of the contract between a fire office and the insured are regulated partly by the terms of the document known as the policy, which embodies them, and partly by law outside these terms, resulting from custom, from statute, or from legal decisions.

The adjustment of a loss when a fire occurs is not unattended with difficulty, even where there are no such complications as those just referred to. To ascertain the quantity, the quality, and the value of property injured, and the degree of injury, is often a work of no little anxiety. Its destruction has swept away the readiest proof which could have been given; or, where partial damage only has been sustained, it is often scarcely capable of exact measurement. The insured is naturally bound to state and prove his claim; and the office, while exposed on the one hand to exaggerated and even to fraudulent demands, may on the other endeavor to exact from an honest claimant details and evidence which it is scarcely possible for him to give. Fortunately for both parties to the contract, there are strong motives on either side tending toward a reasonable adjustment. In most cases the office is guided by the advice of an independent professional valuer, who, while attending to the interests of his employers, has a natural desire, even apart from his instructions, to conciliate the claimant, and to avoid landing the company he represents in troublesome controversies. Claims which cannot be adjusted in this way are usually submitted to arbitration, and it is a condition of most policies that both sides must refer the quantum of loss to an arbiter or arbiters. Few claims find their way into the courts of law, and those only where some principle is involved, or where the claim is thought to be fraudulently overstated, or where the still more serious objection is taken that the fire has been the willful act of the insured.

Many troublesome questions are rendered more easy of solution by the condition that it is in the power of the company to reinstate property rather than to pay the value of it. The insured has not the option of requiring reinstatement. In general an office prefers to settle a claim by payment in cash, but an offer to reinstate may be a convenient as it is a perfectly fair reply to an exaggerated demand, and may adjust the pretensions of competing claimants. The insured is not entitled to "abandon" his property, and the company is not bound to take on itself the care or risk of damaged property; it is for the insured to make the most of the "salvage," and to deduct the value of it from his claim, but in practice it is sometimes found desirable to relieve him of this duty.

A part of the insurance system which has developed into great magnitude is the practice of reinsurance. No one company, however large its resources, deems it prudent to undertake a risk to an unlimited amount in connection with any one set of goods or one locality. An office might restrict its liabilities by refusing to insure to a larger amount than what it pleased to run the risk of, but the convenience of the insured and the interest of its own agents, to say nothing of other considerations, make it difficult for any office so to limit its responsibilities. It therefore issues a policy for the amount proposed to it, but reinsures a part with some other office or offices. Business to a very large amount is exchanged in this way, and there are some offices which professedly, and some which practically, live by the premiums paid over to them by other offices.

What has been said hitherto has had reference chiefly to one side of the fire insurance contract—the obligations undertaken by the company. The consideration they receive in return is the payment made by the insured called the "premium." The premium is calculated at so much per cent. of the sum insured, and is usually paid once a year; but many insurances are effected on mercantile property and on ships for periods less than a year—ten days, one, three, or six months —the rate in such a case being higher than an aliquot part of the yearly rate; and insurances may be effected for seven years by a payment of six times the yearly rate, and for other periods at a proportionate discount. Insurances effected for a year, and stated to be renewable, practically remain in force for fourteen or fifteen days after the expiry of the year; that is, they may be renewed by payment of the premium within these "days of grace," and if a fire occurs in the meantime the company will be liable. This will not happen, however, if an intention not to renew has been manifested on either side.

We may suppose the question to arise:—What ought to be paid for insuring a cotton mill, or a flax or woolen mill, or a weaving factory, or a wharf or warehouse in some large city? The experience of any one office scarcely affords adequate data, and a rate based on the combined experience of many offices has a greater chance of being at once safe and fair. The problem, indeed, is a more complicated one than what has been already said would indicate. The property to be insured may consist of several distinct buildings, and the contents of them: one building may be devoted to operations involving in a high degree the risk of fire; in another the processes carried on may be more simple and safe; a third may be used only for the storage of materials having little tendency to burn. These several buildings may be more or less connected with each other—under the same roof, under different roofs, but with internal communications, contiguous, but without any communications, detached, but still within reach of fire. Of two mills one may work on fine materials, the other on coarse; in one the the machinery may be driven twice as fast as in the other; in one the most hazardous processes may be carried on in the heart of the building, in the other they may be so treated and so guarded as to involve the rest of the property in no peculiar danger. Fairly to measure these various hazards it has been found necessary that the experience and skill at the command of many companies shall be combined, and that the rates shall be the result of consultation and a common understanding.

Now, it is clear that no office will contribute its skill and experience to such a common stock if the effect is to be that other offices may avail themselves of the information in order to undersell it. Consultation about rates, and a common understanding, necessarily involve a reciprocal obligation to charge not less than the rates thus agreed on; in other words, a tariff of rates is developed to which each office binds itself to adhere. The system tends to restrain and moderate the competition for business which inevitably, and to some extent, properly exists among the companies, and its value to them is manifest. But it is also of service to the insuring public. At first sight it might seem that free competition would suit the public best, and that a combination among the offices must tend to keep up rates, and to secure for the companies excessive profits, but a little consideration will show that this is a mistake.

It is an unquestionable truth, though one often lost sight of, that all losses by fire must ultimately be borne by the public. The insurance companies are the machinery for distributing these losses, nothing more. If the losses fell on them, their funds, large as they are, would speedily be exhausted, and the service which they render to the public would come to an end. To those who require insurance against loss by fire, it must be a manifest advantage that they should have many sound and prosperous offices ready to accept their business, and no less able than desirous to earn or to retain the public favor by fair and liberal conduct. A necessary condition of this state of things is that the rates of premium paid for insurance should be remunerative to the offices, and the main object of the tariff system is to secure such remunerative rates.

This it endeavors to do by two methods—by an agreement as to what rates are to be charged, and by affixing such a penalty to dangerous constructions, substances, and processes as to induce, if possible, a lessening of the danger. In other words, and reversing the order, it seeks to diminish the risk of fire, and to secure adequate payment for what risk remains. There can be no doubt as to the benefit the public derive from the former of these, in having pointed out to them, not on the authority of one office, still less on hesitating and contradictory authority, but with all the weight arising from the combined experience of numerous companies, that this or that method of construction, this or that combination of materials, this or that mode of conducting a manufacturing process, is attended by imminent hazard of fire, and in having the lesson enforced by a heavy pecuniary penalty. On the supposition that the offices are correct in their estimate of risks, the effect, and indeed the intention, of their rule is not so much to put money into their own coffers as to lessen the danger, and to save themselves in the first instance, and the owners of property ultimately, from the consequences of preventable fires.

The general principles and practice of fire insurance are, in their main features, the same in most parts of the world. In the United States the business has been pursued with characteristic energy, and with some peculiarities of law and practice. As already stated, the earliest American fire insurance company was organized in 1752, and its policies during the first year covered a sum of $108,360 at an average rate of 1.17 per cent. Each State of the Union has its own regulations about insurance companies, its insurance department, its insurance commissioner, superintendent, or auditor, its system of accounts and checks and public notices, its fees, taxes, and requirements as to deposits. The trouble and expense to which offices are thus exposed, especially where they do business in many States, is very great indeed, while the resulting benefits are problematical. All attempts of this sort are attended with these disadvantages, that they interfere injuriously with honest and well-conducted companies, and afford but a feeble protection against those of a different class; that they involve the government in the odium of failures which it is supposed to be its duty to prevent; that they lessen the sense of responsibility among those who control the offices, and the spirit of prudence and watchfulness among the public; and that they place in the hands of public officials a power and influence which are apt to be abused, and are always open to suspicion. More to be admired and imitated are the State regulations in America with respect to building operations, the extinguishing of fires, and the inquiring into their origin. The business of an insurance agent in America is more recognized than in England as a distinct profession, and the agent is intrusted with greater powers. More has been done to facilitate the working of insurance by the surveying and mapping of large cities, and there has been a greater development of periodical literature devoted to the subject.

Since 1866 a national board of fire underwriters of the United States has existed, and has proved of great service to the insurance offices and to the public.

In France there were at a recent date thirty-two proprietary and about twenty mutual fire-insurance offices. Of the thirty-two offices founded on capital three are provincial offices, and the others are established in Paris. Two confine themselves to reïnsurance. From the returns made by twenty-three of these offices, including all the more important, it appears that their income from premiums is about 92,000,000 francs, and their losses 47,000,000. The average loss during eleven years was 50 per cent. of the premiums. Many of the French offices have been extremely successful; and recently there has been a remarkable increase of new offices in that country.

In 1889 the stock companies reporting to the New York insurance department numbered 153, of which twenty-two were branches of foreign (European) companies. The home companies had assets amounting to $168,727,358, a capital of $60,132,620, and a surplus of $40,760,990. Their total income for the year was $77,206,692, and they paid out for losses $43,931,408. The foreign companies showed assets of $44,862,466, a total income of $30,411,440, and paid for losses $19,296,991. The risks carried by the combined companies amounted to $13,678,732,014.

The system of life insurance embraces a variety of contracts by which the insurers engage to pay capital sums on the decease of policy-holders or nominees, in consideration of other sums received during their lifetime. These contracts may be divided into two classes —(1) those in which the sum insured is certain to be come payable, provided only the insurance is duly kept in force, and (2) those which are of a temporary or contingent character, so that the sum insured may or may not become payable according to circumstances.

To the first of those classes belong the great bulk of the transactions of life insurance offices, namely:—

1. *Whole-Term Assurances on Single Lives.*—These are simply contracts on the part of the insurance office to pay a certain sum (with or without "bonus additions," as the case may be) on the death of the person named in the policy, whenever that may occur. The premium, or consideration for the insurance, is in most cases an annual sum payable during the whole continuance of the policy. It may, however, be arranged in various other ways—as, for example, by a single payment at the commencement of the transaction; or by a limited number of contributions, each larger in amount than the annual premium for the whole of life; or by payment of a modified rate during a limited period and a correspondingly higher rate thereafter. Insurances for the whole term of life are more common than any other kind.

2. *Endowment Assurances.*—Next to insurances for the whole term of life, these constitute the most numerous class of insurances on single lives. The sum insured is payable to the person named in the policy, if he should survive a certain period or attain a specified age, or to his representatives at his death, if that should occur before the time expired.

3. *Insurances on Joint Lives.*—In these transactions two or more lives are included in the policy, and the sum insured is payable when either or any one of them fails.

4. *Longest-Life Insurances, or Insurances on Last Survivor.*—These also are effected on two or more lives, but, instead of falling in by the death of any one of the parties, they do not mature until both or all are dead.

The second class of insurances described above consists principally of two kinds:

1. *Temporary or Short-Period Insurances.*—These are effected for limited periods to cover special contingencies, the sum insured becoming payable only if death should occur within the time specified in the policy. Such insurances may be effected on single lives or on two or more lives, and (in the latter case) may be payable either if one life or all the lives should fail within the period, or only if one life should fail before another, as in the case to be next mentioned.

2. *Survivorship Insurances, or Insurances on one Life Against Another.*—In these the sum insured is payable at the death of A if that should happen in the lifetime of B, but not otherwise. Should B predecease A, the transaction falls to the ground.

Besides these there are transactions of other kinds dealt in by life-insurance offices—such as deferred insurances, where the risk does not commence until the expiry of an assigned period; deferred and survivorship annuities; insurances against issue, for the benefit of expectant heirs; and the like. The system is indeed adapted to nearly every contingency of a pecuniary nature connected with human life.

It may be observed that, while life insurance has much in common with fire and marine insurance, there are some essential differences between it and them. The insurance of houses and goods against fire, or of ships and merchandise against the casualties of the sea, is a contract of indemnity against loss, and in like manner an insurance on human life may be regarded as indemnifying a man's family or his creditors or others interested against the loss of future income by his premature death. But it does not necessarily take the value of such income into account, nor does it relate to any intrinsic value of the *subject* of the insurance—the life of the insured party. Again, in fire and marine insurance loss may be either total or partial. In life insurance the event insured against cannot take place in any limited degree, and there is thus no partial loss. And again (in the first and larger of the two classes into which life insurances are divided) the event is certain to occur, and the time of its happening is the only contingent element. In the other kinds of insurance the events are wholly of a contingent character.

Calculations of Premiums.—The general principles of life contingency calculations are explained in the article ANNUITIES, and it is there shown that such calculations are made by means of mortality tables, which exhibit the numbers of persons who out of a given number born or living at a particular age live to attain successive higher ages, and the numbers of those who die in the intervals. An account of the numerous tables of this kind which have been framed from time to time does not fall within the scope of the present article.

In the United States, life assurance has attained a greater relative importance among financial institutions than in any other country. Its history extends back to an early period, but the system has received its main development in comparatively recent times. During the years which immediately followed the close of the civil war it grew with unparalleled rapidity. The social disorders of the period excited anxiety for the future, and directed earnest attention to institutions which promised exceptional security. The general government, by its financial administration, and especially by its issue of paper money, furnished a powerful stimulus to the speculative tendency in this as in every branch of business. New companies were established in great numbers; new plans and features of assurance contracts were devised; thousands of energetic agents canvassed the community with their solicitations; and the published reports of the assurance companies reflected, in a high degree, the fictitious prosperity of the period of inflation. The financial crisis of 1873 applied to the companies a test of great severity. The mushroom institutions of recent growth fell rapidly; and, while the standard societies, which were administered with wise conservatism, and which had always held the greater part of the business, were unshaken, their growth was seriously checked.

The *Insurance Year-book*, issued by the Spectator Company, gives the aggregates of life insurance in the United States in 1901 as follows:

Premium receipts	$ 324,723,954
Total income	400,603,257
Payments to policy-holders	168,687,601
Total expenditures	267,580,100
Assets	1,742,414,172

On January 1, 1901, there were in force 14,395,443 policies, representing $8,562,139,740 of insurance.

A subject of special interest in connection with life assurance in America is the legislation by which it is regulated. While the national government, under the constitution of the United States, has supreme control over all commerce between the States, the courts hold that insurance in its various forms is not commerce, and that corporations created by a State have no corporate powers beyond the limits of that State, and can transact no business beyond those limits, except on sufferance of the local government. Hence the life-assurance companies are the creatures of State law, and are controlled by the legislatures of the States in which they operate. The first systematic attempt to regulate the business by government supervision was made by the State of Massachusetts under a statute passed in 1858 establishing an "insurance department." New York adopted a similar law in 1859, and the example has since been followed in nearly all the States, even in those which have no important assurance companies of their own. Each State has its own peculiar laws, and these undergo frequent changes in detail as successive legislatures attempt to improve or to reform the business, but the general character of the supervision exercised is the same in the different States, and is as follows: A company may be organized at any time for the business of assuring lives and granting annuities, by obtaining from the proper officers of the State the approval of its name and fundamental law or charter, and by depositing with the insurance department a stated sum, usually $100,000, in prescribed securities, as a guaranty of good faith.

In New York and some other States the insurance department may receive further deposits, representing the reserve or present value of policies, and hold them accumulating in trust, for the security of those particular policies, which are "registered" in the State treasury. This scheme was pressed with vigor a few years ago, as offering peculiar protection, but several companies which adopted it have failed, and the settlement of the claims of creditors upon the funds held by the State has been the cause of much delay and costly litigation.

In each State there is a superintendent or commissioner of insurance whose powers and duties toward the companies are varied and important. The companies must return to him under oath every year full statistics of their business in all departments, showing the precise investments of their funds, the amount and sources of their income, the expenditure for every purpose, and a schedule of policies with the elements for valuing them. It is the superintendent's duty to see that the investments are made in accordance with the laws, which limit the companies to securities popularly regarded as the safest; to make every inquiry which he deems it "desirable for the public interest" to have answered; to make a valuation of the policies of each company by the legal standard; and to report to the legislature every year in full the results of his inquiries and calculations. It is his duty, "whenever he shall deem it expedient so to do," and in particular whenever he shall suspect any statement made by the officers, to "investigate" the affairs of each life insurance company—that is, to overhaul its books and accounts, examine its muniments of title, and test and scrutinize every part of its administration. No company chartered by any other State or government can do any business within the State, except under his license and certificate that it has complied with all the laws; and exclusion from the State is the penalty for neglect to answer any question concerning its business which he may ask. In several States he is required to exclude any company which shall take an appeal from the courts of the State to a court of the United States, in a case arising between it and a citizen.

The most important duty imposed on the superintendent is the administration of the legal test of solvency. In New York and most of the other States, his valuation, according to the legal standard, must be made by the net-premium method, and if any company is unable to meet this test by actual possession of the requisite amount of funds, he must commence legal proceedings for its dissolution, and the distribution of its assets as in bankruptcy. The act making this course imperative in New York was passed in 1879, but many years earlier the practice had become fixed of requiring a company to meet a net valuation of its obligations, or be deemed insolvent. The fairness of this unbending application of the net-premium mode of valuation as a test of mere solvency, and the efficiency of the check supplied by a too exclusive reliance on such a test, have often been called in question.

When an insolvent assurance company is wound up, the rule commonly followed by the courts of equity in distributing the proceeds is to recognize each policy-holder as a creditor for the amount of reserve corresponding to his assurance at the time of the declared insolvency. The representatives of a policy-holder who dies before the actual distribution may claim for the amount of the policy, discounted back to the date of insolvency. The whole process of winding up would be much more satisfactory than it has proved, if the courts and the departments could make a prompt and inexpensive distribution. But in practice there is too much danger of the distribution being delayed until the available assets have been largely dissipated in receivership and legal expenses.

In New York, and several other States, the legislature has interfered to prevent the forfeiture of assurances by the failure to pay a premium, and has undertaken to regulate the payment of surrender values and the grant of paid-up policies in such cases. There is not, however, any general agreement among the different States as to the basis on which such allowances are to be computed. It is too soon to judge finally of the effect of these non-forfeiture laws upon the business; but the impression is believed to be growing among thoughtful policy-holders that they are too favorable to withdrawing members, and tend to weaken the companies, by encouraging the retirement of the most healthy and profitable lives. Laws of this kind usually proceed upon the theory that the reserve for each particular assurance is to be looked upon as in some sense the property of the individual policy-holder.

Some years ago the Chamber of Life Insurance in America (an association formed among the American assurance offices) undertook the collection and arrangement of the experience of a number of the companies in the States.

An interesting feature in the practice of many American offices is their dividing profits on the "contribution method," so called because it aims at returning to each class of policy-holders a share of the surplus proportionate to the amount contributed to its formation.

Marine insurance is a contract by which one party, the "insurer" or "underwriter," engages for a stipulated premium to protect another party, the "assured," against loss arising from certain perils, or sea risks, to which his ship, goods, or other interest may be exposed during a specified voyage or period of time.

The policy of insurance, or instrument which contains the contract, is a printed form, with spaces left blank for the insertion in writing of the particulars of the agreement. The form in general use appears to have been introduced with the earliest practice of British marine insurance. Although worded in a confused and ambiguous manner, its meaning has been clearly defined by a series of legal decisions on the debatable points; and in all cases the written conditions overrule any of the printed clauses that might seem inconsistent with them.

In practice it is usually desirable to conclude an agreement for insurance at once, lest some subsequent intelligence should induce either party to recede; and it is customary for the underwriter to sign a "slip," or short memorandum of the insurance, until the stamped policy can be completed. But such memorandums, however obligatory in good faith, are not legally binding. The assured, however, is under no obligation to communicate to the underwriter a material fact coming to his knowledge between the date of the slip and that of the policy. And, when a valid policy exists, the slip is admissible in evidence to throw light on the circumstances under which the risk was offered and accepted.

A valued policy is one which contains a specific valuation of the interest insured. This valuation forms an essential element in the adjustment of all claims under the policy, and cannot be set aside except on the ground of fraud. The burden of proof, in any averment of fraudulent over-valuation, lies on the underwriter.

An open policy is one in which the value of the interest insured is not specified. In claims under such policies the assured must prove the value of the thing insured. The value of a ship for insurance is what she is actually worth at the commencement of the voyage, including all her stores, provisions, and outfit, money advanced for seamen's wages, and costs of insurance. The difficulty of *proving* a precise value in the case of ships is sufficiently obvious; and, to avoid disputes, policies on them ought always to be valued, as is the usual practice. The value to be proved under an open policy on goods is their first cost, including the expenses of shipment, with any portion of the freight that may have been prepaid, and the costs of insurance. The value to be proved in open policies on freight is the amount of the manifest or freight list, excluding such freight as may have been paid in advance.

When the value proved under an open policy falls short of the sum originally insured, the difference, which is technically termed an over-insurance, is treated as a deduction to be made from the amount of the policy. On this footing a proportionate part of the premium is returnable to the assured, who, on his part, can make no claim on the underwriter for loss or damage beyond the value of his interest as actually proved. If, on the other hand, the value proved exceed the amount of the policy, the assured is regarded as "his own underwriter" to the extent of such excess; and the amount of loss or damage, if such has arisen, is apportioned on this footing between the parties relatively to their several proportions of the total value.

A "short interest" arises when only a part of the interest insured has been exposed to risk, as when some portion of the goods specified in the policy have not been loaded on board of the ship. This case is treated in the same manner as that of over-insurance, from which indeed it does not essentially differ.

Double insurance takes place when the same interest has been insured twice or oftener. This frequently occurs, either through mere inadvertence, or from the want of definite information on the part of the respective persons concerned in the transaction. In such cases, the usual practice is that all the underwriters make a return of premium, in proportion to the amounts of their respective subscriptions, for the excess of the sum insured above the actual value of the interest—the liabilities of the several underwriters under the different policies being of course proportionally diminished. To this rule, however, there are two important exceptions. One of these occurs when two or more persons insure the same thing, in order to protect the distinct interests which they may individually have in it; the other, when the circumstances are such that a claim for loss might have been brought against one set of underwriters before the other set had become liable at all.

The risk on the ship, in voyage policies, commences "at and from" the place specified in the policy, and continues till she arrive at the destination specified, and shall have been there moored twenty-four hours in good safety. On goods the risk begins with their loading and ends with their discharge at the specified ports. On freight the risk usually commences with the shipment, and terminates with the landing of the goods; but if there be a contract of affreightment, under which the goods have been provided for shipment, the risk is held to commence as soon as the ship is in readiness to take them on board. After the risk has once commenced, the whole premium is earned, even although the voyage should not be prosecuted, and the actual risk of the insurers be thereby confined to the mere lying of the ship at the port where the insurance was to commence. But if the risk should not commence at all, or, in technical phrase, if the "policy should not attach," the premium must be returned to the assured.

If the ship should deviate from the regular and usual course of the specific voyage insured without necessity or reasonable cause, the underwriter is thenceforth discharged from all liability under the policy. The insurance becomes void as soon as such deviation begins; and consequently it is quite immaterial whether a subsequent loss of the ship should happen during the actual deviation or after the ship had returned to her course, the insurer being no longer concerned. It is also immaterial whether the assured was or was not cognizant of the deviation. A mere intention to deviate will not vitiate the policy; but if the ship has sailed on a different voyage from that specified, the insurer is discharged although the loss should happen before reaching the point of divergence in the two voyages. An unjustifiable delay in the prosecution of the voyage operates as a deviation. The causes which justify deviation are such as to refit the ship after she has been disabled, to avoid an enemy or an impending storm, or to save the lives of seamen in distress.

In all voyage policies it is an implied condition of the contract that the ship shall be seaworthy at the commencement of the risk. By this is meant that the ship shall be in a fit state, as to repairs, equipments, crew, and all other respects, for encountering the ordinary perils of the voyage insured at the time of sailing on it. Seaworthiness is a condition precedent to the contract; and, therefore, where the ship is originally unseaworthy, the underwriter is discharged even although the loss should result from causes independent of the particular deficiencies constituting the unseaworthiness.

The contract of insurance being preëminently one based on the assumption of perfect good faith between the parties, it is the duty of the party wishing to effect the policy to make a true disclosure of every circumstance likely to affect the underwriter's estimate of the risk. The concealment or misrepresentation of material facts, or the representation of anything not consistent with the facts, will render the policy void. This rule holds good even where the concealment or misrepresentation may have resulted from a mistake, without the intention to deceive.

The perils insured against are described in the printed form as the "adventures and perils of the seas, men-of-war, fire, enemies, pirates, rovers, thieves, jettisons, letters of mart and counter-mart, surprisals, takings at sea, arrests, restraints, and detainments of all kings, princes, and people, of what nation, condition or quality soever, barratry of the master and mariners, and all other perils, losses, and misfortunes that have or shall come to the hurt, detriment, or damage of the said goods, merchandises and ship, etc., or any part thereof."

Losses resulting from breaches of the revenue laws or of the law of nations, or from illegal voyages generally, are not covered by the policy. The risk of "thieves" applies only to plunder committed by open violence, and does not cover losses by secret theft. The illegal acts of the master and crew, if committed without the privity of the owners, will amount to barratry, so as to render the underwriters responsible for them;

but if the master be also owner of the ship, none of his acts will be held as barratrous.

The printed form of the policy declares that "in case of any loss or misfortune it shall be lawful to the assured, their factors, servants, and assigns, to sue, labor, and travel for, in, or about the defense, safeguard and recovery of the said goods and merchandises, or ship, or any part thereof, without prejudice to this insurance: to the charges whereof, we, the assurers, will contribute, each one according to the rate and quantity of his sum herein insured." The object of this clause is to permit the assured to take measures for the recovery of the property without losing any right of abandonment he might have in the circumstances. Although the language of the clause is only permissive, it is a settled rule that the assured is bound so to labor for the recovery of the property. The best practical rule for the assured to follow in cases of partial loss or damage is to act in the circumstances as a prudent man would do if uninsured.

An important clause in the printed policy is what is called the "memorandum," which is as follows: "Corn, fish, salt, fruit, flower, and seed are warranted free from average, unless general, or the ship be stranded. Sugar, tobacco, hemp, flax, hides, and skins are warranted free from average under 5 per cent. And all other goods, also the ship and freight, are warranted free of average under 3 per cent., unless general, or the ship be stranded." The effect of this clause, as interpreted by legal decisions, is to free the underwriter from claims for particular average (or partial damage), or from such claims if under the rates specified, unless the ship be stranded. But if the ship be stranded, he is liable for such claims, whether caused by the stranding or not. For losses of the nature of general average the underwriter is liable whether the ship be stranded or not, and whether the amount be over or under the rates mentioned in the memorandum.

INTERDICT, in its full technical sense as an ecclesiastical term, means a sentence by a competent ecclesiastical authority (popes, councils, bishops with chapters) forbidding all administration of the sacraments, celebration of public worship, and use of the burial service. An interdict may be either local, personal, or mixed, according as it applies to a locality, to a particular person or class of persons, or to a particular locality as long as it shall be the residence of a particular person or class of persons. Local interdicts again may be either general or particular; in the latter instance they refer only to particular buildings set apart for religious services. In the writings of Augustine there is an indication that something of the nature of an interdict had been attempted in his diocese by a certain bishop Auxilius; the attempt is strongly condemned by Augustine, who disapproved of the plan, as making the innocent suffer along with the guilty. In 869 Hincmar of Laon laid his entire diocese under an interdict, a proceeding for which he was severely censured by Hincmar of Rheims. In the *Chronicle* of Ademar of Limoges it is stated that Bishop Alduin introduced there "a new plan for punishing the wickedness of his people; he ordered the churches and monasteries to cease from divine worship and the people to abstain from divine praise, and this he called excommunication."

It was not until the eleventh century that the use of the interdict obtained a recognized place among the means of discipline at the disposal of the Roman hierarchy. Important historical instances of the use of the interdict occur, in the cases of Scotland under Pope Alexander III. in 1181, of France under Innocent III. in 1200, and of England under the same pope in 1209. So far as the interdict is "personal," that is to say, applied to a particular individual, it may be regarded as synonymous with Excommunication (*q.v.*), an ecclesiastical punishment known in one form or another in all churches; the local interdict is quite peculiar to the Church of Rome. It is removed by what is termed "reconciliation."

INTERDICT, in Scotch law, is an order of court pronounced on cause shown for stopping any proceedings complained of as illegal or wrongful. It may be resorted to as a remedy against all encroachments either on property or possession, and is analogous to Injunction, (*q.v.*)

INTERDICTION, in Scotch law, is a process of restraint applied to prodigals and others who, "from weakness, facility, or profusion, are liable to imposition." It is either voluntary or judicial.

INTEREST. At common law an agreement to pay interest is not implied unless in the case of negotiable instruments, when it is supported by mercantile usage. As a general rule therefore debts certain, payable at a specified time, do not carry interest from that time unless there has been an express agreement that they should do so. But when it has been the constant practice of a trade or business to charge interest, or where as between the parties interest has been always charged and paid, a contract to pay interest is implied. Compound interest requires to be supported by positive proof that it was agreed to by the parties; an established practice to account in this manner will be evidence of such an agreement. In short, under the present law, any contract that the parties choose to make as to the amount of interest, or the time or manner of payment, will be enforced like any other agreement.

INTERLAKEN, or Interlachen, a Swiss village in the canton and twenty-six miles southeast of the town of Bern, is situated on the left bank of the Aare in the low-lying district named the Bödeli, between the lakes of Thun and Brienz. The name is strictly applied to the few buildings which occupy the site of the religious houses founded in 1130 and abolished in 1528, but is generally used as including also the Höheweg, a handsome avenue shaded with walnut trees and flanked by hotels and shops, and the village of Aarmühle at its western extremity. The east wing of the Augustinian monastery has been used since 1836 as a hospital for the poor; and the rest of the building, together with the castle added in 1750, is now occupied by government offices. The nunnery, which was suppressed in 1484, has been converted into a prison. The Kursaal, on the Höheweg, was opened by the hotelkeepers in 1869. Between 150,000 and 200,000 strangers visit Interlaken annually, being attracted by its beautiful situation and fine climate, as well as by its goat's-whey cure. Interlaken is a convenient center from which to visit the Bernese Oberland, with the Grindelwald and Lauterbrunnen valleys and the Giessbach and Staubbach falls.

INTERNATIONAL. The International Working-men's Association, commonly called the "International," was formed at London in 1864. It was a society of workingmen of all nations, somewhat like a cosmopolitan trades union, but bearing a still closer resemblance to an international social science association for discussing and furthering the rights of labor. At first moderate in its tone, it soon began to indorse advanced views respecting property and industrial organization. Shortly after it had attained to the height of its power about 1869, it became more and more allied with the most destructive socialism of western Europe. Weakened by internal disunion, and discredited by its approval of the commune at Paris and its alliance with the communal risings in southern Spain, the International died a natural death before it was quite ten years old.

The first four congresses of the International, held at Geneva (September, 1866), Lausanne (1867), Brussels (1868), and Basel (1869), marked the rapid development of the association. It gained its first triumph in the effectual support of the bronze-workers at Paris during their lock-out in 1867; and it repeatedly gave real help to the English unionists by preventing the importation of cheap labor from the Continent. In the beginning of 1868 one hundred and twenty-two societies of South Germany assembled at Nuremberg and declared their adhesion to the International. In 1870 Cameron announced himself as the representative of 800,000 American workmen who had adopted its principles. It soon spread as far east as Poland and Hungary, and it had affiliated societies with journals devoted to its cause in every country of western Europe. The leading organs of the European press became more than interested in its movements; the *Times* published four leaders on the Brussels congress. It was supposed to be concerned in all the revolutionary movements and agitations of Europe, gaining a world-historic notoriety as the rallying point of social overthrow and ruin. Its prestige, however, was always based more on the vast possibilities of the cause it represented than on its actual power. Its organization was loose, its financial resources insignificant; its continental unionists joined it more in the hope of borrowing than of contributing support. At the successive congresses its socialistic tendency became more and more pronounced; it declared its opposition to private property not only in railways, but in mines and the soil, holding that these should revert to the community. Even the principle of inheritance was saved only by a narrow majority. It 1869 Bakunin, the Russian socialist or nihilist, with his party joined the association, and at once asserted his character as the "apostle of universal destruction."

In 1870 the International resolved to establish itself at the very heart of the revolutionary movement by holding its annual congress at Paris. This plan was rendered abortive by the Franco-German conflict. That war, however, helped to bring the principles of the association more decidedly before the world. On general grounds, and during the Austro-Prussian struggle of 1866, it had declared its emphatic condemnation of war; and now the societies of France and Germany as well as the general council at London uttered a solemn protest against this renewal of the scourge.

The relation of the association to the communal rising at Paris in the spring of 1871 has been the subject of much dispute. It is now agreed that the International as such had no part either in originating or conducting it; some of its French members joined it, but only on their individual responsibility. Its complicity after the event is equally clear.

INTERNATIONAL COPYRIGHT. For many years the question of international copyright has been agitated through the press of the United States and of England, and in the legislative bodies, both of those and other nations. Finally an act of congress was passed on March 3, 1891, the effect of the workings of which has yet to be seen, under which, after July 1, 1891, it became possible for American authors to secure copyright privileges in certain European countries, the like privileges being granted by the United States to citizens of those countries. The most important items of this law to an American are that international copyright arrangements between the United States and foreign countries now include Great Britain and her possessions, France, Belgium, and Switzerland. For an American citizen to secure copyright in Great Britain three conditions are necessary: First—the title should be entered at Stationers' Hall, London, the fee for which is 5 shillings sterling, and 5 shillings additional if a certified copy of entry is required. Second—the work must be published in Great Britain or in her dominions simultaneously with its publication in the United States. Third—five copies of the publication are required, one for the British Museum, and four on demand of the Company of Stationers for four other libraries.

Copyright in Canada is to be registered with the Minister of Agriculture at Ottawa, fee $1 for registry and 50 cents for certificate; and the work to be published in Canada and two copies deposited.

Copyright may be secured in France, by a foreigner, by depositing two copies of the publication at the Ministry of the Interior at Paris. No fee nor entry of title required.

To secure copyright in Belgium a foreigner may register his work at the Department of Agriculture, Industry, and Public Works, at Brussels.

In Switzerland, registry of title at the Department of Commerce and Industry at Berne, is optional, not obligatory, fee two francs. If registered, deposit of one copy is required.

Foreign works to secure copyright in the United States must be printed in America, from type set up and plates manufactured in this country. See, also, **Copyright, pages 1765–68.**

INTERNATIONAL LAW is the name now generally given to the rules of conduct accepted as binding *inter se* by the nations—or at all events the civilized nations—of the world. International law as a whole is capable of being very differently interpreted according to the point of view from which it is regarded, and its rules vary infinitely in point of certainty and acceptance. According to the ideas of the leading English school of jurists it is an impropriety to speak of these rules as being laws; they are merely moral principles—positive, it is true, in the sense that they are recognized in fact, but destitute of the sanctioning force which is the distinguishing quality of law. On the other hand, the vast majority of writers on international law have preferred to derive its principles from some transcendental source, such as nature, reason, the Divine will, etc.; and these accordingly have no hesitation in attributing to its rules an intrinsic authority over all the nations of the world. Many of the rules of international law are vague, uncertain, and of disputed authority. Some of the rules, for example, relating to capture in war, the law of blockade, and the privileges of ambassadors are so well ascertained and settled that it is hardly conceivable that they should be broken by any civilized state. On other points—*e.g.*, as to what articles should be contraband of war, when a state should interfere with the domestic policy of another—no universally admitted principles can be said to have been established. The substance of international law has been for this reason divided into various sections, according to the degree of certainty which the rules have obtained. Thus one of the most recent writers on this subject, Doctor Woolsey, distinguishes the rights and duties known to the science as (1) those which are deducible from natural *jus*, which no action of a state can begin or terminate, (2) those deducible from the idea of a state, and (3) those which can be created or destroyed by compact, express or tacit. This and similar divisions do not really explain why some of the rules composing what is known as international law are as fixed and certain as rules of conduct can well be, while others are pure matter of controversy. It is simpler to state the fact and to take note that the area of certainty in international law is constantly increasing.

For example, the rights of embassies were disputed by England till a recent period; and the rules prohibiting the slave-trade and making privateering illegal are comparatively recent additions to the certainties of international law. To say that such rules as the last, being founded on contract, are therefore of inferior authority to the imperishable principles which pronounce all sovereigns to be equal and independent, and distinguish between just and unjust wars, is absurd.

The theory of international law contemplates the world as divided into independent states. That states are sovereign within their own territories, independent of other states, and equal as between themselves is a fundamental axiom of the science. Not that all states are regarded as lying within the domain of this law. In modern times at least it has included all the states of the Christian world; but at one time it excluded non-Christian states, and at this moment it would be difficult to say to what extent it covers the relations of such states *inter se* and with the Christian states of Europe and America. There is little doubt, however, that in course of time all the civilized communities of the world will observe substantially the same system of international law.

In the next place international law regards the states of the world as being either in a state of war or in a state of peace. It prescribes rules of conduct to be observed in the mutual dealings of nations which are at peace with each other, and of nations that are at war with each other; and it fixes the rights and duties of belligerent and neutral nations. If peace is the normal state of nations, as jurists sometimes assert, war is the state which has made the largest demands on the science. The rules of international law with regard to war are more voluminous and more certain than those which govern nations in time of peace.

International law, as we now know it, is substantially the creation of civilized Europe in the last three hundred years, but rules of some kind, however meager, must accompany any state of society in which intercourse, hostile or peaceful, between different communities is common. The great nations of antiquity which have contributed most to the civilization of modern Europe have given least to this branch of that civilization. The *jus gentium* of the Romans does indeed play an important part in the history of international law, but as conceived of by the Roman lawyers it was not international, but a body of positive law composed of the elements common to the nations known to them, including Rome itself. Positive international law does not in fact come into existence until the era of Grotius, although usages of international intercourse must at all times have existed. The sanctity attributed to ambassadors, the importance of formal declarations of war, and the good faith to be observed in promises or treaties would probably be found to be the points of most general recognition.

Independent sovereign states are the units of international law, and whether a given community is such a state is a question of fact. A community having definite territorial limits within which its own government exercises absolute authority, free from all external control, is the proper type of a state in international law. But the world is not parceled out among states thus accurately defined. Where a number of states have been united in a permanent confederation, it may be a question whether the group alone is in international law an independent state, or whether each individual member has retained its international independence. The United States of America are an example of the former case; the German confederation until the recent changes was an example of the other. Again, when one state has placed itself under the protection of another, it may be a question whether it has lost or retained its independent status in international law. The proper test, according to Phillimore, is its capacity *de facto* to deal with other states in peace or war, without reference to the protecting state. States which have lost this capacity have been called semi-sovereign states. They have the organization of an independent nation, but are in practice subject to the rule of another state. The Ionian Islands under the English protectorate were in that position, and in the treaty of 1815 they are described as a single, free and independent state, under the exclusive protection of Great Britain. A similar character attaches to some of the dependencies of Turkey. On the other hand, a large portion of the surface of the earth is occupied by communities having neither the permanent territorial occupation nor the social coherence of civilized states, yet entering into such relations with them as require the recognition of some system of rules. A further question of the highest importance may arise when a portion of an existing state rises in rebellion and sets up a claim to independence. Here again the question is one of fact. If the rebels have succeeded in establishing a government, it is the right and duty of the nations to recognize the fact, and each nation must judge for itself whether the time for recognition has come. Premature recognition would be regarded as an aid to rebellion inconsistent with the rules of international law. The criterion suggested by practice and authority is whether the old government had ceased to contend in fact against the revolutionary state. But other nations are not bound to wait until the old government has itself recognized the independence of the new. Similar questions arise when the form of government in any country is changed by revolution, or when portions of one state are transferred by conquest to the dominion of another. When the new state of things is established in fact, no matter whether justly or unjustly, it must be recognized by other nations.

With the question of recognition is intimately connected that of non-interference. Premature recognition of a struggling rebellion would be regarded as a breach of the principle of non-intervention, but to recognize the independence of an independent State is part of the same duty as to abstain from interfering with it when it has been established.

Independent states are said to be equal in international law, because it is contrary to the nature of an independent state to be in servitude to another. The proposition negatives any claim of precedence on the part of one or more states in international rank, and asserts that all states equally are entitled to the benefit of international rules. No difference in constitution affects this equality, a republic being the equal of a kingdom, and a kingdom of an empire. Beyond this it can hardly be stretched. It is consistent with conventional inequalities in the reciprocal treatment of nations, and with the habitual recognition in Europe at least of the predominance of the Great Powers.

States in relation to the territories occupied by them are treated on the footing of proprietors in law. As between nations each is the absolute owner of its dominions, and the principles applicable to their ownership are taken, as already said, from the Roman law of things.

The territory of a state includes all the lands and inland waters within its boundaries, the mouths of rivers, bays, and estuaries, and the sea to the distance of a marine league along the coast. By a fiction vessels on the high seas, and public vessels everywhere, are treated as part of the territory of the state to which they belong. The high seas are no nation's property—although in the earlier stages of international law exclusive pretensions have been set up to particular seas, as by Spain to the Pacific, England to the seas around Great Britain, and Russia to the North Pacific.

Formal intercourse between nations is carried on under well-ascertained rules. Omitting mere ceremonial regulations, we may notice specially the position assigned by the law of nations to ambassadors. These are the highest class of diplomatic agents, and according to the universal modern practice they are permanently attached to the foreign court to which they are accredited. The office of ambassador, whether permanent or temporary, has at all times been clothed with a character of peculiar sanctity. His privileges during residence at a foreign court may be summed up in the statement that himself, his house, his property, and his household are exempt from the foreign jurisdiction. Like a ship of war in foreign waters, the embassy is exterritorial—supposed by fiction of law to be part of the sovereign's dominions. The ambassador, therefore, is not liable to prosecution in the criminal nor to suit in the civil courts. His official residence is free from the local jurisdiction; but it is no longer an asylum, and a criminal taking refuge there may be seized by the local authority if not delivered up by the ambassador. Ambassadors are further relieved from taxation on goods imported for their own use, a privilege which has not infrequently been abused. An ambassador is entitled to freedom of worship, whether his religion be tolerated by the local government or not. The suite of an ambassador down to his domestic servants are also exempt from the local jurisdiction. The household may in some respects be likened to a separate community under the sovereignty of the ambassador. But it is only in minor affairs that his power to actually execute criminal justice on his own servants would now be recognized. The proper course for him to adopt in a serious charge would be to send the accused home to be tried. The privileges of an ambassador and his suite, it should be added, apply only so far as they do not act beyond the limits of their legatorial character—*e.g.*, as merchants, trustees, and so on. Exceptional crimes committed by an ambassador do not destroy his character or rights—at least according to the general consensus of modern authorities, although English lawyers have argued that a crime *contra jus gentium* destroyed the ambassadorial character. Besides ambassadors, two inferior grades of foreign ministers are recognized, viz., (1) envoys, ministers, or others accredited to sovereigns, and (2) chargés d'affaires accredited to ministers charged with foreign affairs. These three grades of diplomatic rank were settled by the congress of Vienna (1815) to avoid the embarrassment arising from claims of precedence. Consuls are merely local agents of a foreign government, for certain limited purposes, such as facilitating and recording legal transactions affecting the subjects of the state they represent, and assisting them in obtaining their legal rights. They are appointed with the permission (*exequatur*) of the country in which they are to act. They have no immunity from local jurisdiction except under special arrangements. In non-Christian countries the consuls representing Christian states have more extensive functions. In Turkey and the Mahometan countries of the Levant they exercise generally an exclusive criminal and civil jurisdiction over their countrymen.

Hitherto we have considered nations as in a state of peace. War introduces an entirely new order of rules, applying either between the belligerents themselves or between belligerents and neutral states. To the question whether a given war be just or unjust international law has no answer to give, or only a formal one. Any war undertaken in defense of the rights which have been already described might be called a just, and any war undertaken in violation of them might be called an unjust, war. The justice or injustice of any war is really a question of morality, and in proportion as international law has escaped from the merely ethical region it has abandoned the attempt to decide this question. But all wars are legal in international law—that is, they are governed by the rules of the law of war—except wars levied by pirates or piratical communities. The part played by international law has been not to prevent but to regulate warfare. Nations have arrived at a tolerable degree of unanimity as to how wars ought to be conducted, and the result is a certain and progressive law of war. They are far from having arrived at any understanding as to the conditions under which war ought to be allowed; when they are within sight of any such understanding, it will be time enough to talk about a war being just or unjust in international law.

The absence of any legal standard of the justice of a war only adds to the importance of the moral question. There being no law of nations to restrain the warlike ambition of nations, as there is to restrain the passions when war has begun, the purely moral restraints become all important. Among these it might not be worth while to reckon the kind of selfishness which counts the cost of a campaign against a powerful enemy. But a generous horror of war for its own sake may safely be pronounced to be, in spite of recent events, a growing public sentiment, particularly in the English-speaking people of both worlds. There is no English or American statesman who would not at least do lip-service to the principle that an avoidable war is a public crime. Some of them have done more. The great experiment in international arbitration between England and America in 1871 was more glorious to its promoters, and will be more fruitful of benefit to mankind, than fifty victorious campaigns. It is through the establishment of the principle of arbitration that we may ultimately hope to see the question of justice or injustice in war take its place among the topics of international law.

INTER-OCEANIC CANALS. Since the successful construction by M. Ferdinand de Lesseps of the through water communication between the Mediterranean and the Red Seas (see CANAL) the problem of inter-oceanic canals has become one of the most interesting of the age. Particular interest attaches in the United States to the different propositions for ship-canal communication between the Atlantic and Pacific oceans across the Isthmus. In this country the plans most favored have been those which contemplated the Tehuantepec route, that known as the Atrato-Napipi, and the Nicaragua scheme. As early as 1872 the first named route was surveyed by Captain Shufeldt, of the U. S. navy, but its insufficient water-supply, height of summit level, and great number of locks required practically put it out of consideration. In 1873 Professor Mitchell, of the U. S. coast survey, made examinations of the proposed routes, and these were supplemented in 1874 by Lieut. Frederick Collins, U. S. navy, who resurveyed the Atrato-Napipi route, and by Com. E. P. Lull, U. S. navy, who investigated the Aspinwall and Bay of Panama route. Lieutenant Collins found that a canal of thirty and one-fourth miles from the river Atrato to Chiri-Chiri on the Pacific would be required; three and a half miles being in tunnel. A cut averaging ninety feet would be needed for five miles east of the tunnel; the summit level would be one hundred and forty-three feet above mean tide and twenty-two locks would be necessary. In round numbers the cost of this plan was estimated at $100,000,000.

Commodore Lull gave up the idea of a sea-level canal and surveyed for a lock canal from Aspinwall to Panama. This followed the line of the Chagres Valley to its junction with that of the Obisjo, and thence along the line of the latter to the divide, 294 feet above sea-level, descending to the Bay of Panama through the valley of the Rio Grande. This plan proposed the crossing of the Chagres river by a viaduct 1,900 feet long, the surface of the water in the viaduct being the summit-level of the canal, 123¾ feet above tidewater. The length of this proposed canal from sea to sea would be almost forty-two miles, and it would require twenty-four locks and a tidal-lock on the Pacific side. It was proposed to use the Chagres river as a source of supply. The cost of this plan was estimated at about $95,000,000.

On February 7, 1876, the Inter-Oceanic Commission, after considering the plans submitted to it, reported to the president of the United States in favor of the original Nicaraguan route extending from the harbor of Greytown on the Caribbean Sea to Port Brito, on the Pacific. They considered that the route as located by the United States surveying expeditions of 1872–73 "possessed both for construction and maintenance of a canal greater advantages, and offers fewer difficulties from engineering, commercial, and economic points of view, than any one of the other routes shown to be practicable by surveys sufficiently in detail to enable a judgment to be formed of their relative merits." The cost of this canal was estimated at $100,000,000.

Fresh from his triumph at Suez, the great French engineer, De Lesseps, turned his attention to the problem of piercing the Panama isthmus. In 1876 and the following year, French surveying parties looked over the ground and mapped out several routes. In 1879 the Geographical Society of Paris called an international conference which met at Paris in May, and after fourteen days' deliberation pronounced in favor of a sea-level canal from the Gulf of Lunon to the Bay of Panama. The route adopted was that recommended by Lieutenants Wyse and Reclus, of the French navy. The cost was estimated at 1,044,000,000 francs or about $209,000,000, and it was proposed to make a new channel to the sea to carry off the surplus waters of the Chagres, which is subject to sudden floods. An appeal to the public for subscriptions to the "Societé Internationale du Canal Interoceanique" failed. The public believed the cost would greatly exceed the estimate, and M. de Lesseps accordingly made another survey, with the assistance of a commission of engineers. They reported that the amount of excavation necessary had been underestimated by at least 40 per cent., and their estimate of the cost of the Chagres drainage stream was four times that of the congress. In all they thought the canal would cost 843,700,000 francs, and this estimate was reduced by M. de Lesseps to 658,000,000 francs, or about $132,000,000.

In July, 1880, a subscription was opened by the "Universal Company" for 300,000,000 francs. The public responded nobly, all France was in a furore over the great scheme, and the shares offered were subscribed for twice over. The Panama Canal Company was at once organized and preparations made for beginning the work; M. de Lesseps promising its completion in 1888. The route, practically that suggested by Wyse, extended forty-five and one-half miles from sea to sea. The canal was to be one hundred and sixty-four feet wide at the water-line, seventy-two feet wide at the bottom, with a uniform depth of twenty-eight feet below mean low tide. In the heavy cuttings the depth was to be 29.4 feet, the width at the water-line eighty-five and one-half feet and at the bottom seventy-nine feet. The "deep cut" was to be fifteen and one-half miles in length and its maximum depth at the divide 333 feet. The work of final surveys, the preparation of quarters for laborers, and the getting machinery and plant in place was begun in 1881, and actual excavation commenced in the spring of 1882. An enormous number of men were set to work on different parts of the line, and rose-colored reports of progress were made from time to time.

But disease broke out and a fearful mortality among the working staff followed. The Chagres river proved to be absolutely unmanageable and disaster marked the path of the great enterprise. By May, 1885, more than $100,000,000 in cash had been expended, the obligations contracted exceeded that amount by one-half, and not 10 per cent. of the total excavation estimated as necessary had been made. M. de Lesseps visited and revisited the Isthmus, and each time expressed his renewed confidence in his ultimate triumph, although conceding finally that an extension of time would be required, and more money needed. But the reports of independent experts, sent out by English capitalists, made a very different showing to those of the optimistic engineer. Renewed subscriptions were sought, but the response was not favorable, and, finally, after an attempt to secure an enormous subvention from the French Government had failed, the failure of the project was announced, and the work practically abandoned. The actual truth as to the situation is scarcely known even yet, but it is certain enough that this century will not see the completion of De Lesseps' canal.

An alternative route, which finds much favor in the United States, has been suggested and is known as the Nicaraguan route. The proposed canal extends from Greytown or San Juan del Norte, on the Caribbean Sea, to the port of Breto, on the Pacific. Its length is 169.8 miles, of which 40.3 miles are canal, and 129.5 miles open navigation through Lake Nicaragua, the San Juan river, and the basin of the San Francisco river, a tributary of the San Juan. To carry out this plan seven locks will be necessary, the rivers will have to be deepened and widened and some very heavy rock cutting done. The scheme contemplates a canal from 80 to 120 feet wide at the bottom and from 80 to 340 feet wide at the surface, with ample depth for all ocean-going vessels. Its estimated cost is $65,000,000.

INTERPLEADER, in English law, is the form of action used when a person is sued at law for the recovery of money or goods wherein he has no interest, and which are also claimed of him by some third party.

INTESTACY. In dealing with the property of a person who dies without making a will, the law of England distinguishes sharply between his real and his personal estate. The devolution of the former is regulated by the rules of INHERITANCE, (*q.v.*) The destination of the latter is marked out by the Statute of Distributions. The proper conditions of a testamentary disposition of property will be found under the heading WILL.

The distribution of an intestate's personal estate is carried out under the authority of administrators, whose duties are generally the same as those of executors under a will.

In the United States the English Statute of Distribution has been taken as the basis of the law for the distribution of personal property in intestacy, and its principles have been applied to real property also. In a majority of the States the descent of real and personal property is to the same persons and in the same proportions, and the regulation is the same in substance as the English Statute of Distribution. In Georgia the real and personal estate of the intestate is considered as altogether of the same nature and upon the same footing.

INUNDATIONS. From time to time history has recorded the occurrence of great disasters arising from the overflow of land by the waters of streams and seas. With few exceptions the traditional records of the oldest civilizations contain references to a general flood, and more authentic history chronicles these catastrophes by the hundred. The United States has been a great sufferer by inundations, particularly in the valley of the Mississippi. The most disastrous flood of modern times occurred on May 31, 1889, when by the breaking of a dam in the Conemaugh valley, Penn., the whole of the valley was flooded, and a greater part of the city of Johnstown was swept away. An official statement of the loss of life on this occasion is: bodies found and identified, 1,072; bodies buried as unknown, 648; missing, 575—total known loss, 2,295. Other estimates place the loss at nearly double this figure and the damage to property was several millions.

INVERARY, a royal, parliamentary, and municipal burgh of Scotland, the county town of Argyllshire, forty miles southwest of Glasgow. Population, 1,000.

INVERNESS, a maritime county of Scotland, is bounded on the north by Ross, northeast by Nairn and Elgin, east by Banff and Aberdeen, southeast by Perthshire, south by Argyll, and west by the Atlantic. It measures eighty-five miles from northeast to southwest, and fifty-five miles from northeast to southwest. The total area is 2,723,840 acres or 4,211 square miles. The mainland portion has an area of 3,043 square miles, of which 135 are under water. The area of the islands is 1,213 square miles, of which the area under water is sixty-one square miles. The surface of the county is very varied, consisting of ranges of lofty mountains alternating with deep narrow valleys, the beds of numerous lakes and rivers. Its exterior outline is very irregular. Both the mainland and island portions abound in grand and picturesque scenery. The islands in the county are those of the Outer Hebrides (excluding Lewis, which belongs to Ross-shire, but including Harris), and Skye, Raasay, Rona, Scalpa, Eigg, etc. (See HEBRIDES.) The mainland portion is divided into two nearly equal parts by the valley of Glenmore, or the Great Glen, which crosses it from the southwest to the northeast. This glen is now traversed by the Caledonian Canal, which, begun in 1803 and finally completed in 1847, forms a line of inland navigation between the east and west seas, from the Moray Firth on the northeast to Loch Linnhe on the southwest. The greater part of the county is occupied by mountains, many of which are over 3,000 feet in height, the highest summits being Ben Nevis, 4,406 feet, and Cairngorm which is partly in Banffshire, 4,095 feet. Within the last twenty-five years great progress has been made in the reclamation of waste land, the arable land in 1855 extending only to 42,030 acres. There are nearly 300,000 acres of deer forests, and about 1,700,000 of heath land, one-half of which affords pasturage for sheep, the other half being of no value except for grouse shooting. The population (1901) was 90,182.

INVERNESS, a royal, parliamentary, and municipal burgh of Scotland, the capital of the above county, is finely situated at the northern end of Glenmore, on both sides of the river Ness, about half a mile from its mouth, and on the Highland Railway, 144 miles north-northwest of Perth, and 109 west-northwest from Aberdeen. Population, 20,365.

INVESTITURE, in feudal phraseology, means the act of giving corporeal possession of a manor or office—an act which was usually conjoined with some significant ceremonial, such as the delivery of a branch, a banner, or some other appropriate symbol of the thing conveyed. Investiture with staff and ring was during and after the eleventh century the name given to the ceremony by which ecclesiastical dignitaries were admitted by the civil power to possession of the temporalities of their office. The word investiture is later than the ninth century; the thing itself is an outcome of the feudal system.

IO is the heroine of a legend associated with the cultus of Hera, both in Argos and in Eubœa. In Argos the great temple of Hera was situated on a hill called Eubœa, on the road from Mycenæ to the city of Argos; while in Eubœa the legend was associated with the town of Argoura. The identity of names shows that the legend dates from a very ancient period of the worship; and as, in accordance with the universal rule in such legends, Io is only a form of the goddess, it is highly probable that she represents an older stage of the cultus than the better known Hera.

IODINE, thus named on account of the violet color of its vapor, is one of the so-called halogen elements.

Iodides occur in minute quantity in most mineral waters and in sea water. The ashes of many marine algæ are rich in them; and formerly iodine was chiefly extracted from kelp or varec, the ashes of seaweed, by distilling the mother liquor remaining after the separation of the less soluble salts by crystallization with manganese dioxide and sulphuric acid. Of late years, however, large quantities of iodine have been obtained from crude Chili saltpeter by a similar process.

The chief use of iodine is in the preparation of methyl-iodide, a substance employed in the manufacture of certain of the so-called aniline dyes. In medicine it is frequently applied externally as an irritant. Potassium iodide is also an important medicinal agent; and iodoform, a substance prepared by acting on alcohol with iodine in presence of an alkali, has latterly been introduced as an agent for external application in certain diseases. It is one of the most approved antiseptics and is extensively used in dressing wounds of any nature whatever. Several iodides, especially ammonium, cadmium, and potassium iodide, are largely employed in photography.

ION, of Chios, one of the five Greek tragic poets of the canon, was born in Chios, probably in the 74th Olympiad—485-480 B.C. Although he seems to have lived much in his native island, where he met Sophocles in 441 B.C., he paid frequent visits to Athens, making the acquaintance of Æschylus, and becoming a warm admirer of Cimon and a severe critic of the rival statesman, Pericles. His first tragedy dates from the 82d Ol., between 452 and 449 B.C.; and he is mentioned as third to Euripides and Iophon in the tragic contest of 429 B.C. From a passage in the *Peace* of Aristophanes which was produced in 421 B.C., it is generally concluded that Ion died before that year. The names and a few fragments of eleven of Ion's plays remain; the latter give him a place only inferior to the three great tragic masters of Greece.

IONA, or ICOLMKILL, a small island of the Hebrides, on the west coast of Scotland, in the county of Argyll, is situated about eight miles south of Staffa and one and one-quarter miles west of the southwestern promontory of Mull, from which it is separated by the shallow Sound of Iona. Its length is about three and one-half and its breadth one and one-half miles. The total area is about 2,000 imperial acres, of which about 600 are under cultivation.

IONIA, capital of a county of the same name in Michigan, is situated on Grand river, at the junction of several railroads. It is thirty-four miles east of Grand Rapids and thirty-eight miles northwest of Lansing, the State capital. It contains two national and one other bank, a high school and several public schools, ten churches, foundries, potteries, breweries, flour-mills and railroad machine-shops. The town, which has a population (1900) of 5,209, is noted for its fine residences.

IONIA, in ancient geography, was the name given to a portion of the west coast of Asia Minor, adjoining the Ægean Sea, and bounded by Lydia toward the east. Like the adjoining districts of Æolis on the north and Doris on the south, it was not a country or region marked out by any natural boundaries, but merely consisted of a strip of land near the coast, of comparatively small breadth, which, together with the adjacent islands, was occupied by Greeks of the Ionic race, and was thus permanently distinguished from the interior district, which was inhabited by the Lydians.

According to the tradition universally received among the Greeks, the cities of Ionia were founded by emigrants from Greece on the other side of the Ægean, and their settlement was connected with the legendary history of the Ionic race in Attica and other parts of European Greece, by the statement that the colonists were led by Neleus and Androclus, the two sons of Codrus, the last king of Athens. All that we know upon anything like historical evidence is that at the earliest period when we hear of any Greek population as existing on the east coasts of the Ægean we find there a large group of cities, distinct in dialect and institutions from those of the north and south of them, and generally regarded both by themselves and their neighbors as derived by direct immigration from the people who bore the name of Ionians in European Greece. Of the period of their settlement in Asia we have no trustworthy evidence; but it appears to have been anterior to the rise of the Lydian monarchy, which gradually became their most formidable neighbor.

The cities comprised under this name in historical times were twelve in number—an arrangement copied, as it was supposed, from the constitution of the Ionian cities in Greece, which had originally occupied the territory in the north of the Peloponnesus subsequently held by the Achaians. These were (proceeding from south to north)—Miletus, Myus, Priene, Ephesus, Colophon, Lebedus, Teos, Erythræ, Clazomenæ, and Phocæa, together with the two important islands of Samos and Chios. Smyrna, which subsequently assumed so prominent a position among the cities of this part of Asia, was originally an Æolic colony, but was afterward occupied by a band of Ionians from Colophon, and became thenceforth an Ionian city—an event which had taken place before the time of Herodotus. But at what period it was admitted as a member of the Ionian League we have no information.

The cities above enumerated unquestionably formed a kind of league or confederacy among themselves, of which their participation in the Pan-Ionic festival was the distinguishing characteristic. But, like the Amphictyonic League in Greece itself, this was rather of a sacred than a political character; every city, as usual among the Greeks, enjoyed absolute autonomy, and, though common interests often united them for a common political object, they never formed a real confederacy like that of the Achaians or Bœotians; and the advice of Thales of Miletus to combine in a more intimate political union found no approval among them.

The territory thus occupied was of small extent, not exceeding ninety geographical miles in direct length from north to south, with a breadth varying from twenty to thirty miles, but to this must be added the remarkable peninsular promontory of Mimas, together with the two large islands. So intricate indeed is the coast-line that the *periplus* or voyage along its shores was estimated at 340 geographical miles, or nearly four times the direct distance. A great part of this area was, moreover, occupied by mountains, none of them attaining to any great elevation, but filling up a considerable space.

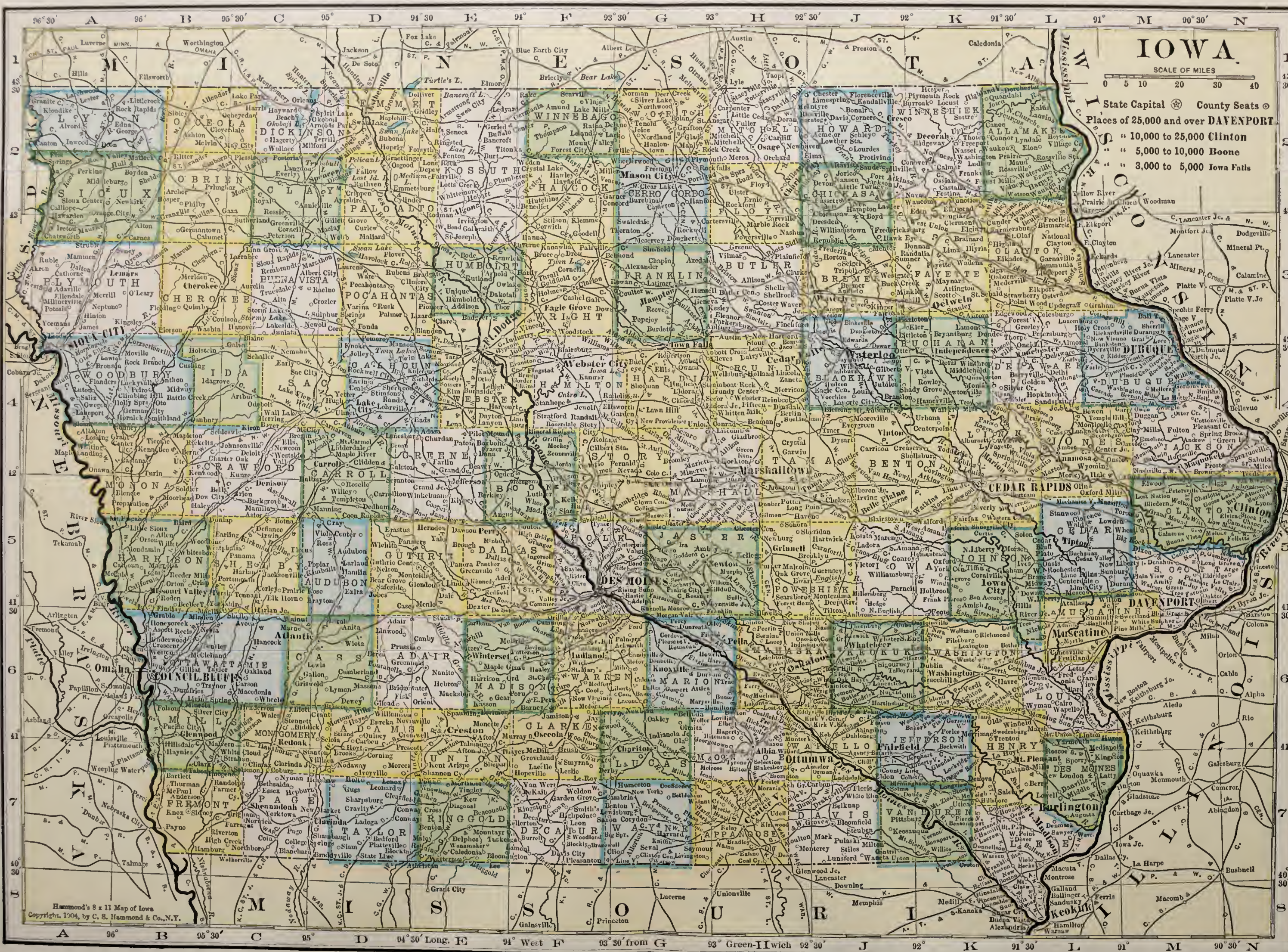
IONIAN ISLANDS, the ordinary collective name of Corfu, Cephalonia, Zante, Santa Maura, Ithaca, Cerigo and Paxo, with their minor dependencies. As the islands are seven in number they are often called the Heptanesus in Greek, and Heptanesian or Septinsular is the corresponding adjective. The history of the use of Ionian as the distinctive epithet of the islands is sufficiently obscure; but it is probable that, like the application of the name Ionian Sea to this part of the Mediterranean, it is due to the settling of Ionian colonists on the coasts and islands. The islands have no real geographical unity beyond that involved in the fact that, with the exception of Cerigo, situated off the south coast, they are all within a little distance of the west coast of Greece or Albania. Corfu is separated from the mainland by not more than two miles, while the passage from it to Santa Maura, the nearest of the larger islands, is no less than forty-six. Since 1863 the whole Heptanesian territory has been incorporated with the kingdom of Greece, and the several islands have been assigned to different administrative divisions. Corfu, Cephalonia and Zante each gives its name to one of the thirteen nomarchies of the kingdom; Cerigo is part of the nomarchy of Argolis and Corinth. The area of the seven islands is computed at 1,041 square miles. The population shows a steady increase: in 1836 it was 204,242 (110,496 males, 93,746 females); in 1854, 228,981 (123,254 males, 105,727 females; in 1870, 229,516; and in 1900 about 260,000.

IOWA, one of the northwestern States of the American Union. Its boundary lines are—on the south and north the parallels 40° 36′ and 43° 30′ of N. latitude, on the east the Mississippi river, and on the west the Missouri and Big Sioux rivers. The south eastern corner projects slightly below the parallel of 40° 36′, the boundary following the Des Moines river down to its mouth. The neighboring States are Minnesota on the north, Wisconsin and Illinois on the east, Missouri on the south, and Nebraska and South Dakota on the west. The length of the State from north to south is about 200 miles, and its greatest breadth from east to west 300 miles. Its area is 35,855,900 acres, or 56,270 square miles.

The State lies entirely within the prairie region of the Mississippi valley, and has a level or undulating surface. Its mean height above the sea is 925 feet—ranging from 500 in the southeast to 1,700 in the northwest. About 24,600 square miles of the area rise less than 1,000 feet above sea-level.

The surface presents very little relief. A broad elevation (1,700 feet at the north boundary, and decreasing gradually southward) separates the waters of the Mississippi from those of the Missouri. The position of this "divide" is, for the most part, near the western border of the State, giving to the branches of the Mississippi long courses and an easy fall, while those of the Missouri have comparatively short courses and a rapid fall. Near their sources, these branches, both of the Mississippi and Missouri, flow in broad, shallow valleys. Farther down their courses, however, bluffs develop, and increase gradually in height, while the valleys in general become narrower. The bluffs bordering the valley of the Mississippi range in height from 200 to 400 feet, the valley between them being usually from four to eight miles in width, although in a few places, as at Dubuque, they close in upon the river on both sides. On the Missouri, the bluffs range from 200 to 300 feet in height, inclosing a bottom-land five to twelve miles in width.

The Mississippi and Missouri are the only navigable



Hammond's 8 x 11 Map of Iowa
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rivers. They have ample depth of water for all purposes of inland navigation. The other rivers are the Upper Iowa, Turkey, Maquoqueta, Wapsipinicon, Iowa, Cedar, Skunk or Checauqua, and Des Moines, flowing into the Mississippi, and the Chariton, Nodaway, Grand, Nishnabotany, and Little and Big Sioux, flowing into the Missouri. None of these streams are navigable. A few small lakes are found in the northwest, on or near the divide between the two great rivers. The area of swamp and marsh surface is proportionately small, and is rapidly diminishing.

As in most of the prairie region of the Mississippi valley, there is in this State but little forest, the timber being confined to the bottom-lands of the streams and the faces of the bluffs. The commonest trees are the oak, elm, cottonwood, black walnut, hickory, maple, and linden. Upon the bluffs is found a sparse growth of pines and red cedar.

It is estimated that about 7,000 square miles are underlaid by the Coal-measures. Within this area coal beds of workable thickness and quality have been found at Fort Dodge, Moingona, Des Moines, and Oskaloosa, where they are being extensively worked. The coal is bituminous, no anthracite having been found in the State. The northeastern part of Iowa is included within the great lead region of the Upper Mississippi; and, although the palmy days of the mines of that region are over, the product is yet very important. The ore, which is galena, is found in pockety deposits in the limestones of the Silurian formation. These deposits vary immensely in size, and in general extend to no great depth, and therefore cannot be relied upon for permanence.

The climate resembles in its essential features that of the rest of the prairie States, excepting that toward the west the aridity of the atmosphere and the decreased rainfall characteristic of the great plains begin to be perceptible. The annual rainfall ranges from twenty-four to forty-four inches, with an average of about thirty-six inches, the southeastern portion receiving the greatest amount, and the western part the least. The mean annual temperature ranges from 42° to 52° Fahr., the summer mean from 66° to 79° and the winter mean from 14° to 27°, showing a difference between the summer and winter temperatures of 52°.

The agricultural interest is by far the largest and most important in the State, as the figures for 1900 will show:

PRODUCTS.	ACREAGE.	BUSHELS.	VALUE.
Corn	9,804,076	383,453,190	$97,297,707
Wheat	1,689,705	22,769,440	11,457,808
Oats	4,695,391	168,364,170	33,254,987
Barley	627,851	18,059,060	5,342,363
Rye	89,172	1,179,970	480,817
Buckwheat	13,834	151,120	84,842
Flaxseed	126,453	1,413,380	1,380,102
Broom corn (lbs.)	2,220	1,178,130	50,639
Clover seed	....	15,114	69,640
Grass seed	....	1,276,958	1,146,123
Hay and forage (tons)	4,644,378	6,851,871	30,042,246
Potatoes	175,888	17,305,919	3,870,746
Sweet potatoes	2,688	224,622	128,981
Onions	1,195	292,097	177,088
Tobacco (pounds)	131	127,420	8,345
Dry beans	2,427	24,903	38,296
Dry pease	1,556	27,606	24,473
Sorghum cane (tons)	7,999	10,033	29,125
Sorghum syrup (gals.)	....	521,212	190,695

The soil is extremely fertile, whether drift, bluff, or alluvial. The drift, whose name explains its origin, covers the greater part of the State. It is a dark loam, one to two feet in depth, and of almost inexhaustible fertility. The bluff soil or loess occupies the country bordering upon the valley of the Missouri. It is supposed to be a subaërial deposit, brought by the prevalent westerly winds from the plains of Nebraska and Dakota, and deposited here near the borders of the humid region. It has a great depth, reaching 200 feet in some instances, and is everywhere extremely rich.

The manufacturing industries have not yet reached a high degree of development. Those branches connected with agriculture have naturally made most advance. For means of communication and transportation Iowa is dependent almost entirely upon its railroads and its two bounding rivers, It has no canals, if we except the short one around the Des Moines rapids.

In 1900 the railroads had 9,405 miles of track, the assessed valuation of railroad property being $42,858,890. The gross earnings of all the railroads for 1888 were $37,462,779.

The number and value of different classes of live stock on January 1, 1900, were:

	NUMBER.	VALUE.
Horses	1,392,573	$77,720,577
Mules	57,579	3,737,529
Milch cows	1,423,648	46,349,012
Other neat cattle	3,943,982	96,169,890
Swine	9,723,791	43,764,176
Sheep and lambs	1,056,718	3,956,142

The officers of the executive department are the governor, lieutenant-goxernor, secretary of state, auditor, treasurer, superintendent of public instruction, who, except the second named, form the executive council. All these officers are elected by the people, the term of office being in each case two years. No one is eligible for the office of governor or lieutenant-governor who is less than thirty years of age, or has not been a citizen of the United States and of the State for at least two years. The governor is commander-in chief of the militia, and possesses the pardoning power except in cases of treason. The lieutenant-governor is *ex officio* president of the State senate; and. in the event of the death, resignation, or removal of the governor, he assumes his office.

The legislative department is vested in the general assembly, which consists of a senate and a house of representatives. The former consists of not more than fifty senators, who are elected for terms of four years. Each senator must be at least twenty-five years of age, and must be a citizen of the State. The house of representatives consists of not more than 100 representatives. Their term of office is two years. A representative must have attained the age of twenty-one years. The general assembly meets at Des Moines (which since 1857 has been the capital), and holds a regular session once in two years.

The judicial department comprises a supreme court and district and circuit courts. Its officers are the judges of the several courts, clerk and reporter of the supreme court, attorney-general and district attorneys, all of whom are elected by the people. The supreme court consists of four judges, whose term of office is six years. The senior in office is the chief justice. The State is divided into a certain number of judicial districts, in each of which are elected every four years a judge of the district and of the circuit court and a district attorney. The latter is the prosecuting attorney for his district.

The representation of the State in the national congress consists of two senators, chosen by joint ballot of the two houses of the general assembly, and of eleven representatives, elected directly by the people of the congressional district.

The State is divided into ninety-nine counties. Their officers are all elected by the people, and the tenure of office is two years. They are—three, five, or seven supervisors (who collectively form a "board of supervisors"), an auditor, a clerk of the district and circuit courts, a sheriff, treasurer, recorder, superintendent of schools, coroner, and surveyor. The board of supervisors have authority over the property of the county, levy State and county taxes, and keep in repair roads and bridges. Each county is divided into civil townships, which are six miles square, corresponding with the congressional townships of the general land system. Each township is under a civil government, administered by three trustees, a clerk, an assessor of taxes, and two or more justices of the peace and constables. All these officers are elected by the people, for one year, except the justices of the peace, whose term is two years.

The assessed valuation of property (real and personal) was in 1902 nearly $558,508,269. The debt of the State was only $10,937 and that due to the school fund. The total bonded and floating debt of the counties was $2,932,376; of the cities, $3,257,210; and of the school districts, $1,125,138. Iowa has 218 state banks and a large number of private banks. Its educational system is similar to that of all the states which were formed from the Northwest Territory; every sixteenth section of land being set apart for the permanent school fund. The amount of the permanent fund was $3,732,174 and of the available funds $3,681,432. The school population numbered in 1900 731,154. The number of pupils in the public schools was 566,223. School statistics for 1900 show 12,615 ungraded schools, with an average duration of nearly eight months in the year, and 84,957 volumes in their libraries. The male teachers numbered 4,948, the females 23,841. The 12,997 school-houses were valued at $12,715,766. The county school-house fund was $334,699; the contingent fund $619,233, and the teachers' fund $2,149,302.

The State has a large number of institutions for higher instruction, and is well supplied with reform schools, orphan asylums, and asylums for the blind and the deafmute class. No State in the Union has a larger church representation. In 1882 the state adopted by 155,436 votes against 125,677 a constitutional amendment prohibiting the manufacture and sale of liquors, wine, and beer, but the Supreme Court decided that it had not been constitutionally adopted. In 1885 the legislature passed a prohibitive statute which is still in force.

The population of Iowa has increased steadily and swiftly since its settlement. In 1840 it contained 43,112 people; in 1870, 1,194,020; and in 1880, 1,624,620. Official returns of the United States census of 1900 show a population of 2,231,853, a gain of 17 per cent during the decade. There are no towns of over 65,000 population in the State, but the number of thriving towns of from 5,000 to 40,000 population is large.

Iowa was originally a part of the Louisiana purchase. In 1834 all that part of the United States lying west of the Mississippi river and north of Missouri, including the present area of Iowa, was placed under the jurisdiction of the Territory of Michigan, and two years later the Territory of Wisconsin was created, including what is now Iowa. In 1838 Iowa itself was made a Territory, and on December 28, 1846, it was admitted to the Union as a State. At the time of the Louisiana purchase, this region was occupied by the Sioux, Sac and Fox, and Iowa tribes of Indians. The first white settlements within the State were made along the Mississippi in 1833—Fort Madison, Burlington, and Dubuque being the first points occupied. From these points settlements spread westward, and the growth of the Territory and State has from that time been rapid and steady. For later statistics, see SUPPLEMENTS.

IOWA CITY, the county seat of Johnson county, Iowa, 120 miles east of Des Moines, is a flourishing manufacturing center and possesses ample railroad facilities. It was the capital of Iowa from 1837 to 1856 and the old State buildings are now occupied by the State University, organized in 1860. The city possesses twelve churches, two national banks, several newspapers, daily and weekly, and a superior system of common schools. Population (1900), 7,987.

IPECACUANHA. The root used in medicine under this name is obtained from *Cephaelis Ipecacuanha*, A. Rich., a small shrubby plant of the natural order *Cinchonaceæ*. It is a native of Brazil, growing in clumps or patches in moist shady forests, and is believed to extend to the Bolivian province of Chiquitos, and the valley of Cauca in New Granada. The drug of commerce is procured chiefly from the region lying between the towns of Cuyaba, Villa Bella, Villa Maria, and Diamantina in the province of Matto Grosso, and near the German colony of Philadelphia, north of Rio Janeiro. Ipecacuanha, although in common use in Brazil, was not employed in Europe previous to 1672. In France within a few years after that date it formed the chief ingredient in a remedy for dysentery, the secret of the composition of which was purchased by the French Government for 1,000 louis d'or, and made public in 1688. The botanical source of ipecacuanha was not accurately known until 1800.

The mode of obtaining the root is thus described by Weddell. The collector or *poayero* grasps the whole of the stems of the *poaya* or ipecacuanha plant in one hand, and loosens the roots by inserting a stick obliquely under them, to which is given a see-saw motion; the adhering soil is then shaken off, and the root placed in a bag. A poayero collects on the average about ten to twelve pounds of the root in a day, but sometimes as much as thirty pounds, or as little as six pounds or eight pounds. The root requires to be dried rapidly; it is therefore spread out in the sunshine as much as possible, and at night is covered over to shield it from the dew. In about three days, under favorable circumstances, it becomes dry, and is then broken up, sifted to remove sand or dirt, and packed in "serons," or bales made of cowhide. The root is gathered during the whole of the year, but in less quantity during the rainy season on account of the difficulty of drying the root. As imported, about three packages out of four are damaged by sea-water or damp. The root appears to be possessed of very great vitality. Like other dimorphic plants, ipecacuanha ripens and seeds best when cross-fertilized, and presents various forms.

Ipecacuanha root occurs in pieces about two or three lines in thickness, of a grayish-brown or reddish-brown tint externally, having a ringed or annulated surface, and exhibiting a white or grayish interior and a hard, wiry center. It has a faint, rather musty odor, and a bitterish taste. It is usually mixed with more or less of the slender subterranean stem, which has a very thin bark, and is thus easily distinguished from the root. The activity of the drug resides chiefly in the cortical portion, and hence the presence of the stem diminishes its value. The variety imported from New Granada and known as Cartagena ipecacuanha differs only in its larger size and in being less conspicuously annulated. Ipecacuanha owes its properties to the presence of rather less than 1 per cent. of the alkaloid emetine, which, with the exception of traces, occurs only in the cortical portion of the root.

Ipecacuanha is one of the safest and most valuable emetics, being more suitable for administering to children than any other. The amount required to produce its effect varies considerably, children, as a rule, being more tolerant than adults: according to Ringer, thirty grains is the average dose for an adult, twenty grains for young children. Its action is rather slow, taking place in from twenty minutes to half an hour after ingestion. Minute quantities of the drug, on the contrary, such as drop doses of ipecacuanha wine every hour or three times a day, according to the urgency of the case, have the effect of checking vomiting arising from natural causes. The nauseating and emetic properties of ipecacuanha are believed to be due to its influencing the peripheral terminations of the pneumogastric nerve, since it produces vomiting even if injected into the blood. In nauseating doses it acts both as a diaphoretic and antispasmodic. It is also a stimulant or irritant of the mucous membranes, and is hence classed as an expectorant, and used successfully in cough, bronchitis, gastric catarrh, and diarrhœa. Some individuals are so sensitive to the action of ipecacuanha as to suffer, even on smelling the drug on entering a room where it is kept, all the symptoms of coryza, hay fever, or bronchitis. In large doses of from sixty to ninety grains, repeated, if required, in ten or twelve hours—the patient lying on his back to prevent sickness or nausea—it is found to be one of the most valuable remedies in dysentery, especially in the epidemic and sporadic forms met with in tropical and malarious countries. Externally applied in the form of ointment, ipecacuanha causes considerable irritation, followed by the appearance of pustules and ulceration.

IPEK, a town of Upper Albania, in the Turkish eyalet of Uskub, situated in the upper valley of the Drin between the mountains Peklen and Koprionik. Population about 12,500.

IPHICRATES, an Athenian general who flourished in the earlier half of the fourth century B.C., owes his fame as much to the improvements which he made in the accoutrements of the peltasti or light-armed troops as to his numerous victories gained by their aid. Increasing the length of their javelins and swords, substituting linen corselets for their heavy coats-of-mail, and introducing the use of light shoes, called after him *Iphicratides*, he increased greatly the rapidity with which these troops could make the sudden forays that were so common in the military tactics of the time. The date of his death is unknown.

IPHIGENEIA is the heroine of several famous Greek legends. She is generally said to be the daughter of Agamemnon, and is also called Iphianassa, though the two are distinguished by Sophocles and by the writer of the *Cypria*. Agamemnon had offended Artemis, who therefore prevented the Greek fleet from sailing for Troy, and could be appeased only by the sacrifice of his daughter. According to some accounts the sacrifice was completed, according to others Artemis carried away the maiden to be her priestess in the Tauric Chersonese, and substituted for her a hind. In this new country it was her duty to sacrifice to the goddess all strangers; and as Orestes came in search of her she was about to sacrifice him, when a happy recognition took place. Iphigeneia is a favorite subject in Greek literature and art. She is the heroine of two plays of Euripides; but none of the many other tragedies founded on her story have been preserved.

IPSWICH, Old Eng. *Gippeswic*, the county town of Suffolk, sixty-eight miles northeast of London by rail, stands on a gentle ascent above the left bank of the Gipping, which widens here into the Orwell estuary. Its lower and older portion, irregularly built, retains some curious specimens of ancient domestic architecture, as Sparrowe's House (1567), with quaint emblematic moldings of Charles II.'s reign, Archdeacon's Place (1471), and Wolsey's Gateway (1528), sole relic this of one of those "twins of learning," the colleges of Christ Church and Ipswich. Population (1901), 66,622.

IPSWICH, the second most important town of Queensland, Australia, is built on the south side of the river Bremer at the head of navagation, about twenty four miles in a westerly direction from Brisbane. It is the center of a rich pastoral and agricultural district the principal product being maize. Coal is worked on the banks of the Bremer and the Brisbane, and there is a woolen factory in the town. Population, 12,000.

IQUIQUE, a seaport town of Peru, in the department of Tarapaca. In the twenty-five years from 1850 to 1900 it rose from a mere fishing village to be a place of from 18,000 to 42,440 inhabitants. This rapid growth was solely the result of the trade in the nitrate of soda which is found in exhaustless abundance in the neighboring country, and of which during the five years 1874 to 1878 there was annually exported from the province, by way of Iquique, Mejillones, Junin, and Pisagua, an average of 276,811 tons. About sixty or seventy tons of iodine are also manufactured in the nitrate-of-soda factories, varying in proof from 95 to 98 per cent.

IRAK ADJEMI (*i.e.*, Persian Irak), also called Jebal (Arabic, mountains) and Kohistan (Hindustani, mountain-land), is the most important of the eleven provinces of Persia, comprising the larger part of the western half of the country, or upward of 138,280 square miles. To the north lie Azerbijan, Ghilan and Mazanderan, to the east Khorasan, to the south Farsistan and Khuzistan, and to the west Ardilan and Luristan. The mountains for the most part run west and east, or northwest and southeast. Among the important valleys are those of Hamadan, Ispahan and Yezdikhast. The principal river—though it only belongs to Irak Adjemi in the middle part of its course—is the Kizil Uezen or Sefid Rud, which drains about 25,000 square miles of country, rising between Hamadan and Tabriz, in that part of the Kurdistan highland which bears the name of Besch Parmak or Pentchangusht (Five-Finger Mountain), flowing north-northeast and then east to its junction with the Hasht Rud, and finally breaking through the Elburz range and finding its way to the Caspian. The country corresponds in large part to the ancient Media.

IRAK ARABI, or Irak el Arabi, to which the name Irak is more properly applied, is the district between the Tigris and Euphrates, and from the Euphrates west to the desert, its northern limit being from Anah on the Euphrates to Tekrit on the Tigris. It corresponds to the land of Chaldæa or Lower Mesopotamia. There is a town Irak in the district, about twenty miles east of the Euphrates.

IRAWADI, or Irrawaddy, the principal river in the province of British Burmah, traversing the Pegu division from north to south. The Irawadi is formed by the junction of two streams whose source is yet unknown, in about 26° N. latitude. It reaches the sea by nine principal mouths. The only ones used by seagoing ships are the Bassein and Rangoon mouths. The area of the catchment basin of the Irawadi is 158,000 square miles; its total length from its known source to the sea is about 900 miles, the last 240 of which are in British territory. As far down as Akouk-toung in Henzada district its bed is rocky, but below this sandy and muddy. It is full of islands and sandbanks; its waters are extremely muddy, and the mud is carried far out to sea. The river commences to rise in March; about June it rises rapidly, and attains its maximum height about September. The river is navigable at all seasons by steamers of light draught as high as the first defile, and during the dry season for steamers drawing six feet as far as the frontier.

The broad channel of the Irawadi has always been the sole means of communication between the interior and the seaboard. From time immemorial the precious stones, minerals, etc., of Upper Burmah, Siam, and the Chinese frontier provinces have been brought down by this route. At the present day the great bulk of the trade is in the hands of the "Irawaddy Flotilla Company," an important English carrying firm; but native boats still maintain a strenuous competition. The flotilla of the company consists of about sixty vessels, including both steamers and flats. Their headquarters are at Rangoon, whence steamers run twice a week to Bassein and also to Mandalay.

IRBIT, a town of European Russia in the government of Perm, seventy miles northeast of Ekaterinburg, at the confluence of the Irbit with the Nitza, a subtributary of the Obi. Though the St. Petersburg *Calendar* for 1878 gives the permanent population as only 4,212 (in1898 the number was 20,064). it is one of the most important trade centers of northern Russia, and during its great fair (February 1–13 to March 1–13) it is visited by upward of 20,000 people.

IRELAND, a large island to the west of Great Britain, and along with it forming the United Kingdom, is encircled by the Atlantic Ocean, and on the east is separated from Great Britain toward the north by the North Channel, whose width at the narrowest part, between the Mull of Cantyre and Torr Head, is only thirteen and one-half miles; in the center by the Irish Sea, whose width is 130 miles; and in the south by St. George's Channel, which has a width of sixty-nine miles between Dublin and Holyhead, and of forty-seven miles at its southern extremity. The island has the form of an irregular rhomboid, the largest diagonal of which, from Torr Head in the northeast to Mizen Head in the southwest, measures 302 miles. The greatest breadth of the island is 174 miles, and the average breadth about 110 miles. The total area comprises 32,531 square miles, or 20,822,494 acres. Territorially it is divided into four provinces—Leinster, Munster, Ulster, and Connaught—and thirty-two counties, the number of counties included in the different provinces being twelve, six, nine, and five respectively. These thirty-two counties are divided into 316 baronies, comprising 2,532 parishes, which are further divided into townlands or plowlands numbering about 60,760, with an average size of over 300 acres each.

The central part of Ireland is occupied by a great undulating plain, whose highest elevation is 300 and average elevation about 200 feet. In the center of the country, from Dublin Bay on the east to Galway Bay on the west, this plain stretches from shore to shore, but toward the south and north it is inclosed by an irregular semicircular belt of mountainous country. The surface of the plain is broken occasionally by isolated hills. Throughout nearly the whole breadth of its extent it rests on the Carboniferous Limestone, and in several places there are remains of the Upper Carboniferous strata or Coal-measures, by which the Carboniferous Limestone was at one time overlaid, and which have been carried away during a vast period of denudition chiefly by the action of subaërial agents. At one period the Carboniferous beds must have extended widely beyond their present limits, and have formed the surface strata of the uplands to the northwest and southeast. In the northwestern highlands of Sligo, Leitrim, and Fermanagh they still form a lofty table-land, which occasionally rises into peaks about 2,000 feet high.

Along the present coast-line there are to be seen in several places traces of ancient sea margins, the most continuous being those on the northern and eastern coasts, especially in County Antrim. Of still more ancient sea margins there are evidences in the terraces at the base or on the flanks of the mountains. The present coast-line, especially on the west and south, is very much indented by bays and inlets, which Hull, in his *Geology of Ireland*, attributes in many cases to the chemical action of the sea-water on the limestone rocks. On the south coast they most commonly run in a northerly direction with a westerly inclination at the upper end, and on the west coast the direction of the larger inlets is easterly, although several of the smaller ones run north, south, and north-east. Their troughs have mostly been excavated in the synclinal folds of the rocks, which therefore frequently project far into the sea in the form of high and bold headlands. On the northern coast the inlets generally run in a southerly or southwesterly direction. Most of those on the east coast have by the accumulation of sand been either wholly or partly formed into lagoons; and on the southeast coast the sea has made considerable encroachments on the land.

The principal inlets are—on the east coast Belfast Lough, Strangford Lough, Carlingford Lough, Dundalk Bay, Dublin Bay, and Wexford Harbor; on the south coast Waterford Harbor, Dungarvin Harbor, Youghal Bay, and Cork Harbor; on the southwest coast Roaring Water Bay, Dunmanas Bay, Bantry Bay, Kenmare River, and Dingle Bay; on the west coast Tralee Bay, the mouth of the Shannon, Galway Bay, Clew Bay, Blacksod Bay, Killala Bay, Sligo Bay, and Donegal Bay; and on the north coast Sheep Haven, Lough Swilly, and Lough Foyle. In all, Ireland possesses fourteen harbors suitable for the largest ships, seventeen for frigates, and over thirty for coasters, besides an immense number suitable for fishing boats.

The islands of Ireland are small in size, and are situated near the mainland, most of them being formed of rocks from which, according to Hull, the adjoining Carboniferous strata had been denuded by the action of the sea-water. They are most numerous on the west coast, especially opposite Galway, Mayo, and Donegal. Off the Donegal coast the largest is Neish Aran. Separated from the mainland of Mayo by a narrow isthmus is Achill, the largest island of Ireland, and in Clew Bay there is an immense number of islets all formed of drift. An archipelago of granite rocks off the coast of Galway is formed of continuations of the mountains, and at the mouth of Galway Bay are the three islands of Aran, composed of Carboniferous Limestone. Among the picturesque stacks of rocks off the coast of Kerry the most notable are the Skelligs. The largest islands opposite Cork are Dursey Island, Bear Island, and Clear Island, south of which is a picturesque rock called the Fastnet, on which there is a lighthouse. On the east coast the principal are Lambay Island, Innispatrick, and Ireland's Eye off County Dublin, and Copeland Island at the mouth of Belfast Lough. On the northern coast the principal are Rathlin Island off Antrim, and Tory Island off Donegal.

Several of the rivers of Ireland, including the largest of them, have had their channels determined by a previous physical condition of the land surface, and must have been formed during a long period of denudation. Many of the valleys are dried-up river beds, and along various of the present river valleys traces of old river terraces may still be seen. In some cases the alterations of the courses by breaks and dislocations of the strata are of very recent occurrence. In the districts of Sligo and Fermanagh, as well as of Galway, Clare, Kerry, and Cork, the rivers and streams have frequently cut out subterraneous passages through the limestone, in some cases altogether disappearing; and along their courses *turloughs* or blind lakes, and abrupt deep holes called *sluggas* are frequently formed.

Owing to the moistness of the climate and the lay of the surface of the country, Ireland is more intersected by large rivers than England or Scotland, and it is a remarkable circumstance that in several cases there are groups of rivers with closely contiguous sources, which, however, flow in widely different directions. The largest river is the Shannon, which has its source in the Carboniferous mountains of Fermanagh and Leitrim, and flows southward through Lough Allen, Lough Ree, and Lough Dearg to Limerick, where it opens out into a wide estuary and takes a westerly course to the ocean. Its total length is 240 miles, and it drains an area of 4,544 square miles. The Suir, the Nore, and the Barrow, which have their sources not far from each other in the Slieve Bloom mountains, and unite at Waterford, drain together an area of 3,400 square miles.

The Grand Canal, which with its various branches has a length of 165 miles, connects Dublin with the Shannon at Shannon Harbor; and the Royal Canal, with a length of seventy-six miles, connects Dublin with the Shannon at Cloondora.

Many lakes of considerable extent exist both in the mountainous and lowland districts of Ireland, and the number of small lakes is very great. Altogether the area covered by lakes amounts to 711 square miles, of which 287 are in Ulster, 305 in Connaught, 69 in Munster, and 50 in Leinster. Lough Neagh in Ulster is the largest inland lake in the United Kingdom, and has an area of 153 square miles, with a general depth of from twenty to forty feet. Lough Erne in Fermanagh has a length of upward of forty miles, but a breadth of only eight miles. Properly speaking, it consists of two lakes five miles apart and connected by a river, the upper lake being thirteen miles in length with an area of 9,278 acres, and the lower twenty-four miles in length with an area of 28,000 acres. Both lakes are dotted with numerous islets, and the lower one is famed for its picturesque beauty. The lakes of Killarney in Kerry, which are three in number and closely adjoin each other, are situated in the midst of wild and picturesque mountain scenery. The area of the lower lake is 5,001 acres, of the middle one 680, and of the upper one 430. Lough Dearg, a small lake in the south of Donegal, has been resorted to from time immemorial as a place of penance by Roman Catholics.

Of the Upper Carboniferous beds which at one time overspread the central plain of Ireland, only small patches remain in isolated spots, serving chiefly as an indication of the immense loss that has been sustained in an important element of material prosperity. The principal coal-fields are the Leinster, the Munster, the Connaught, and the Tyrone.

The average quantity of coal raised in Ireland annually is about 130,000 tons, of which about 80,000 are raised in Leinster, 30,000 in Munster, 16,000 in Antrim and Tyrone, and 6,000 in Leitrim and Roscommon. As the annual importation of coal exceeds 2,000,000 tons, it is evident that the coal supply obtained from Ireland's own mines is quite a minor element in its prosperity; but the industry might be much more largely developed, the total available amount of coal being estimated at 180,000,000 tons.

For the absence of coal the country is to some extent compensated by the supply of peat fuel obtained from the red bogs situated in the central plain, and occupying a large tract included within two lines drawn across the island, the one from the Hill of Howth to Sligo, and the other from Wicklow to Galway. Originally this district was occupied by a forest, principally of oak-trees, which, after being gradually killed by the growth of mosses and other peat-producing plants, were succeeded by a forest of firs, these also in turn perishing. The average depth of the bog is 25 feet, but in some cases it is over 40 feet. According to its depth it varies in color, from whitish brown to a brown-black closely resembling coal. The brown or red turf in the center forms the best fuel. The lower strata sometimes pass into lignite. Lignite of an immense thickness is found around the southern shores of Lough Neagh. In the mountain districts the bogs usually consist of brown turf of only about 12 inches thickness. Preglacial or interglacial peat has been found in Queen's County, County Galway, and County Tipperary, and submarine bogs with remains of an ancient pine forest have been discovered off the southwest coast. The bogs of the central plain contain in a state of good preservation animal and human skeletons, tree canoes, gold and silver coins and ornaments, crannogs or lake dwellings, log houses, and wooden roadways. The total area occupied by bog is 2,830,000 acres, or about one-seventh of the surface of the island, mountain bog occupying 1,254,000 acres, and flat red bog 1,576,000 acres.

The deficiency in coal supply is the more to be regretted in the case of Ireland on account of its immense stores of iron, which for want of proper fuel remain unutilized. Red hematitic iron of a very rich kind is found associated with the coal-fields in the districts of Tyrone, and in Cork and Waterford. Valuable pisolitic ore occurs between the sheets of basalt in Antrim. Iron is met with in great quantities in the bogs, and is easily fusible, but the quality is not nearly so good as that of the clay iron which occurs in great abundance in the coal districts of Connaught. Some centuries ago the manufacture of iron was one of the most important industries of Ireland, the surface of the country being dotted over with small iron-works, in which the ore was smelted by wood charcoal, but as the supply of wood became exhausted the industry was wholly discontinued, the last of the old furnaces having been put out more than a hundred years ago. Of late years iron-mining has been prosecuted with some briskness in Antrim, as well as in Down and Londonderry. But the available supply of coke is wholly insufficient, and until other methods or materials of smelting have been discovered, the valuable iron ores of the country will contribute a very small modicum to its prosperity.

From the gold ornaments and crucible ladles and other implements used in the purifying of gold that have been discovered in a bog on the borders of Limerick and Tipperary, it would appear that that metal was manufactured there at a very early period; and there is a tradition that gold was smelted for King Tighearnmas about 1620 (or 915) B.C., in one of the valleys of the Liffey. About the end of last century a nugget of gold twenty-two ounces in weight was found in a tributary of the Ovoca, and, the government having shortly afterward taken up the enterprise, placer mining was carried on for some years. The gold was from 21⅜ to 21⅞ carats fine, the alloy being silver.

In very ancient times there were silver mines at Argetros, County Kilkenny, and near Toomavara, County Tipperary. The metal occurs both as native silver and in the lead ore, which sometimes yields as much as eighty ounces of silver to the ton. Lead is found in a greater number of localities than any other metal.

The principal copper mines are at Knockmahon in Waterford, at Cronebane and Connary in Wicklow, and at Bearhaven, Ballycommisk, and Cosheen in Cork. Chalcopyrite or yellow copper is the most common, but melaconite or black copper is found at Cronebane and Connary, and tetrahedrite or gray ore in the small beds to the south of Bearhaven. Native copper is common in most of the districts where the ore is found, and in many places large quantities of copper are collected from the streams by precipitation on iron.

The climate of Ireland is more equable than that of Great Britain, both as regards temperature and rainfall. No district in Ireland has a rainfall rising so high as that of large portions of the Highlands of Scotland, or falling so low as that of several large districts in the east of Great Britain.

In wet years the excessive moisture is very prejudicial to cereal crops, especially in the southern and western parts of the island. Probably the returns either of corn or of green crops would in exceptional cases be very deficient under any mode of culture, and they might on the average, in the southwestern district, be less remunerative than those of grass; but undoubtedly, if tillage were more practised on pasturage farms, the rearing and feeding of cattle would be more satisfactorily performed. Moreover, the soil in many cases is such that most kinds of crops thrive in the moist climate, and much might be done by drainage to procure a drier atmosphere and to mitigate the prejudicial influences of rainfall at the period of ripening. In regard to the natural fertility of the soil, and the ease with which it can be cultivated, Ireland as a whole has great advantages over Great Britain. Strong, retentive clay soils, sandy soils, chalky and gravelly soils, are almost wholly absent, and the mixture of soils resulting from the great variety of stratification, as well as from the detritus carried down to the plains, has created many extensive districts of remarkable richness. The most fertile part of the country is the tract in Munster known as the "Golden Vein," stretching from Cashel in Tipperary to near Limerick. Along the banks of the Shannon there are long stretches of flat lands formed by deposits chiefly of calcareous and peaty matter carried down by floods, and at the estuary of the river this matter has been largely mixed with blue silt deposited by the sea. Extensive districts of similar formation are connected with the Suir, Nore, and Barrow, and with the Bann. In other parts of the limestone plain a rich soil has been formed by the decomposition of drift accumulated by the Esker Sea, mingled in some cases with the remains of granite; and a mixture of a variety of rocks has also greatly benefited many of the other limestone soils. The red bogs contain underneath them abundant marl admirably adapted for use in reclaiming the land. In the districts of the Old and New Red Sandstone, including the greater part of Cork, and portions of Kerry, Waterford, Tyrone, Fermanagh, Monaghan, Mayo, and Tipperary, the soil in the hollows is generally of remarkable fertility. Where gneiss and schist rocks prevail a finely productive soil frequently occurs, resting on inliers of limestone and other calcareous rocks. Indeed, Ireland contains comparatively little irreclaimable land, and even in the mountainous districts which are unsuitable for tillage there is often soil sufficient, with the aid of the moist climate, to yield pasturage of superior quality in great abundance; and more than two-thirds of the surface of the country, being less than 500 feet above sea-level, possesses a temperature well adapted to all the usual kinds of crops.

But, although enjoying such favorable natural conditions, Ireland as a whole lags far behind most other portions of the United Kingdom in agricultural progress, both as regards the circumstances of the peasantry and the development of the capabilities of the soil for producing food. The causes of this state of things are somewhat complex; and, having their chief connection either directly or indirectly with the procedure of the legislature, they have been in operation for several centuries, during which, instead of diminishing in influence, they have apparently gained strength by intermixing and entangling with each other. Until a comparatively recent period the system of landholding in Ireland was the tanistry or communal, governed by the ancient Brehon code. According to this code the land belonged primarily to the tribe or commune, and was vested in the chief or tanist, who, from his rank as a noble, held a portion of it as his own property, had a life interest in a second portion from the office to which he had been elected, and possessed jurisdiction over a third portion, the communal land, which was divided annually. The nobles from among whom the tanist was chosen had the right of ownership of land, another class had the right of ownership of chattels, which went to the sons by gavelkind. Only certain classes of the tribe--the Saer Céili or "free tenants," and Daer Céili or "base tenants"—could obtain security of tenure for life, the others being either yearly tenants, free laborers, or slaves. The interests even of the yearly tenant were preserved by stringent regulations, and in the course of generations it was possible to rise from the lowest social grade to the rank of a "free tenant." The lands of the tenants went to their male descendants by gavelkind. Even the free laborers and the slaves, with the exception of those who were convicts or prisoners, had the right of sustenance and shelter on the estate of their lord. Unlike those of Great Britain, the ancient laws of Ireland remained uninfluenced by Roman legislation; and, although the Danish invasions caused some disturbance of the old order of things, the regulations so far as the possession and tenure of land were concerned remained practically unmodified until the invasion of Henry II. The natural consequence was that the pastoral mode of life associated from the beginning with the Brehon code should also remain unchanged, the more especially as soil and climate alike were favorable to the growth of luxuriant pasturage; but, as pastoral employment is that which is least able to support a dense population, a large proportion of the servant class gradually sank into a condition of idleness and wretched poverty. Unhappily the result of the Anglo-Norman invasion was not such as to improve this state of things by the gradual influence of other laws and customs, but to introduce into the social system disturbing and irritating elements, which kept alive all the old evils in a more aggravated form. Henry II. nominally bestowed the entire land of Ireland upon ten of his followers, but practically, with the exception of the small district of the Pale, it remained in the possession of its ancient lords. Confiscations became more frequent as the power of the English increased, and within that portion of the territory over which English rule did not extend the tenants and laborers, in the unsettled condition of society, suffered severely from the irresponsible authority of the nobles. Henry VIII., the first English sovereign who really held sway over the whole island, induced the nobles to acknowledge him on condition that their ancient rights and privileges were left intact; but this arrangement was set aside by Elizabeth, whose reign was signalized by the great wars, resulting in the composition of Connaught and the planting of Munster. By the former of these, while possession was secured to the nobles in their estates, the lands in the province were alienated from the clan to the chief, and the free tenants became virtually proprietors of their farms; and by the latter 574,628 acres, the estate of the earl of Desmond, were parceled out to be peopled according to a plan founded wholly on English customs. Soon after the accession of James I. in 1603, tanistry and gavelkind were abolished by decision of Queen's Bench, and the estates of the Ulster nobles—511,465 acres in extent—were forfeited to the crown, to make way for the great plantation of Ulster. The custom of gavelkind was, however, revived by the act of Queen Anne against the Catholics, and the statute was not repealed till the reign of George III. The confiscations were repeated on a larger scale during the Stuart and Cromwellian periods, from which time may be dated the complete practical overthrow of the Brehon system except in Ulster and a few isolated districts where the shadow of it still lingers in the custom known as tenant-right. Even, however, after the subjugation of Ireland by Cromwell, Sir William Petty, in his *Political Anatomy*, written in 1672, estimated the value of the tenant's claims for improvements and benefit of leases at one-third of his annual rental. The same writer calculated that, whereas in 1641 about two-thirds of the good land belonged to the Irish or Catholics, at the time he was writing the proportion was as nearly as possible reversed, the figures being as follows: Purchased by the Protestants of Connaught of the transplanters 80,000 acres, possessed by the English and Protestants and Church 5,140,000, possessed by the Irish 2,280,000. Of the 1,100,000 inhabitants, the proportion of Irish to English was as nine to three; and six out of every eight of the Irish lived in a "brutish, nasty condition." After the confiscations which followed the wars of William III., the Catholics did not possess more than one-seventh of the soil. The penal laws by which the Catholics were disabled from holding freehold property tended to effect a still further transferrence of proprietorship to the Protestants. The functions of the proprietor were generally performed by the large Protestant tenant, to whom a long lease of the property was granted and who sublet to the Irish farmer. Frequently the farms were subdivided and sublet to the third, fourth, or fifth degree, and, as the Catholics were disabled from holding leases for more than thirty-one years, and at less than two-thirds of a rackrent, they necessarily occupied the lowest step in this peculiar social scale. Instead of an industrious and thriving class of peasant proprietors, which the Brehon system left to itself would in all probability have gradually developed, a race of wretched cotters sprung up, whose only inheritance now guaranteed to them by the remains of the old Brehen system was their deep-seated conviction as to their inalienable rights to the soil; the custom which, without now recognizing these rights, threw upon them the expense not only of fencing, draining, and other improvements, but of the erection of all the dwellings on the farm; and their dependence on the proprietor, one, however, who was now generally an alien, and from whom they held their small patches of soil on payment in labor according to conditions strung to the utmost degree of severity by the process of subletting and an unlimited competition. Support by any other form of industry than agriculture was rendered impossible by laws which practically paralyzed the commerce and manufactures of the country, and agriculture itself was additionally hampered by the enactments passed in the reign of Charles II. against the exportation to England of cattle, sheep, and pigs, of salt beef and bacon, and even of butter and cheese. These enactments, combined with that final one by which the prohibition formerly passed against the exportation of woolen manufactures to England or the colonies was extended also to foreign countries, caused the "middle men" to turn their attention to woolen smuggling; and, finding it a more lucrative means of livelihood than that of squeezing money from impoverished tenants, they in many instances drove the cotters from their farms, which they changed into sheep-walks.

The acts of 1771, 1778, and 1782, which removed the Roman Catholic disabilities in regard to the holding of leases and property, and the act of 1793, which extended to the Catholics the forty shillings franchise, had, on account of the peculiar social condition created by former legislation, practically as disastrous effects as even the penal laws which they superseded. The landlords for election purposes created an immense number of the lowest kind of freeholds, which they let at exorbitant rents owing to the high price of provisions during the great war. These prices indeed gave a temporary stimulus to agriculture, and led to the conversion of a considerable amount of pasturage into tillage, but practically the position of the freeholder was more servile than that of the previous tenant-at-will, and when prices sank to their normal rate at the close of the war he found himself in a condition of absolute ruin. At the same time, by this minute subdivision of leaseholds, an immense increase had taken place in the agricultural population, whose numbers could perhaps scarcely have found support under any system of agriculture, although undoubtedly under a system of peasant proprietorship support would have been possible to a much larger number, inasmuch as the principal profits of tillage would have fallen into the hands of the tillers of the soil instead of those of absentee proprietors. To aid the landlords in freeing themselves from the incubus of impoverished tenants an Eviction Act was passed in 1816, and further protection was afforded them by the Subletting Act of 1826, but it was not until after the abolition of the forty shilling leasehold suffrage in 1829 that any important diminution took place in the leaseholds. Under tenant-at-will, which was then generally substituted, the subdivision of holdings was not materially diminished, although for some years previous to the occurrence of the potato blight and the repeal of the corn laws more than one-fourth of the population stood in need generally of relief, and the landlord, in order to escape the burdensome taxation consequent upon the Poor Law Act of 1838, had begun the transformation of small holdings into large farms.

The potato blight and the repeal of the corn laws, occurring nearly simultaneously, caused an immediate and almost complete sweep to be made of the smaller class of holdings. The consequence was an enormously rapid diminution of the population, which made whole districts of the country almost tenantless, but which, great as it was, only removed the abnormal strain of hardship under which the peasant was suffering, and brought him no permanent relief from his burdens by an increase of wages or more favorable terms of occupancy. Indeed, tenancy-at-will was still further increased by the Parliamentary Votes Act of 1850, which granted the suffrage to those who for twelve months were rated as occupiers of land valued at £12 a year.

One of the chief obstacles to agricultural improvement in Ireland has been the unsatisfactory relations between landlord and tenant. The legislation bearing on the subject has been of a very various and contradictory character. There are no official records of evictions earlier than 1849. A special return presented to the House of Commons in April, 1881, gives by provinces and counties the number of evictions for each year from 1849 to 1880, as ascertained by the police. The numbers are of course only approximately correct, but err by defect, not by excess. The total number of families evicted during that period was 90,107, comprising 460,570 persons; but of these, 21,340 families, comprising 115,859 persons, were readmitted. Deducting readmissions, the numbers in 1849 were 13,384 families, 72,065 persons; in 1850 they were 14,546 families, 74,171 persons; in 1851 they declined to 8,815 families, 43,449 persons; and they gradually diminished until 1856, from which year until 1862 the numbers though fluctuating fell short in each year of 1,000 families. There was a considerable diminution from 1865 till 1878, when they rose to 834 families, or 3,916 persons, while in 1879 the numbers were 1,098 families, 5,576 persons, and in 1880 they were 1,893, or 9,036 persons. During the half year ending June 30, 1881, the numbers evicted were 1,433 families or 6,557 persons. It 1865 it was enacted that no evictions should take place without the intervention of the sheriff; but, although a means was thus supplied of obtaining records absolutely correct, the sheriffs in some instances neglect to send in returns. The large increase of ejectments since 1870 shows that the Landlord and Tenant Act of that year has failed in ordinary circumstances to improve the relations between landlord and tenant; and, while some of its provisions have had in certain respects a beneficial effect, it has also exercised a variety of prejudicial influences, and not only broke completely down under the strain of the famine of 1879, but in many cases led to the almost unavoidable infliction of great hardship on the tenant. The salient principle of the act was the abandonment of the position assumed in the act of 1860, which endeavored to place the relation of landlord and tenant on the simple basis of contract. Stated positively, its leading features were the legal confirmation of the Ulster tenant-right and other ancient customs, the provision made for compensation for loss on quitting and for improvements, and the sanctioning of grants on loan and other facilities to tenants to aid in the purchase of their holdings. Since the passage of the act the average sum adjudged annually in cases between landlord and tenant has been over £18,000, of which more than a third has been for Ulster tenant-right. The amount adjudged annually has varied considerably but irregularly, and of late years there has been a diminution in the number of cases.

To remedy the defects of the act of 1870, a new act was passed in 1881. Practically it secures to the tenant a near approximation to the "three F's"—"free sale," "fair rent," and "fixity of tenure." "Free sale" is granted so far as is compatible with a due regard to the rights of the proprietor. The "fairness" of a rent may be decided by the "intervention of court," and, while on certain conditions a "fixed tenancy" may he agreed upon between landlord and tenant, an approximation to this is obtained in other cases by provisions in regard to rent and "compensation." Additional facilities have also been given to tenants to purchase their holdings, and provision has been made for grants of money to aid in the reclamation of land and in emigration. A feature of the act is the creation of a land commission as a supreme court of appeal, except in special cases, in questions between landlord and tenant, and with the power of sanctioning loans.

Leases are not held by so many as one-tenth of the total number of farmers, tenancy-at-will being preferred, partly for the freedom it allows, and partly because it is thought to involve a tacit consent to permanent occupancy.

One of the chief hindrances to agricultural progress in Ireland has been absenteeism. According to Sir William Petty, who wrote in 1672, one-fourth of the real and personal property of Ireland was possessed by absentees. Prior, in his *List of Absentees*, published in 1729, divides them into three classes—those who are seldom or never seen in Ireland, those who visit Ireland for a month or two, and those who are occasionally absent. Arthur Young gives the rental of absentees in his time as £732,200 (about $3,600,000), or about one-seventh of the whole estimated rental, and Swift declared that one-third of the rental of Ireland was spent in England. Absenteeism continued to increase until the close of the great war in 1816, and although it diminished from that time, a substitute for many of its evils was supplied by the rapid impoverishment of a large number of idle and extravagant squireens. To help in freeing the country from this incubus, an act was passed in 1848 to facilitate the sale of encumbered estates in Ireland, which, however, proved wholly ineffectual, and was superseded by another in the following year appointing a commission of three persons to constitute a court for the purpose. This court commenced its sittings in October, 1849, and, from that period until it closed its sittings in August, 1859, 3,547 sales were effected, the gross amount of which was £25,190,839 ($127,000,000). In 1859 the court was reconstituted on a permanent footing under the title of the "Landed Estates Court," power being conferred on it to deal with unencumbered as well as encumbered estates. Up to January, 1880, the sales in this court amounted to £27,277,140 ($136,000,000), so that probably about one-sixth of the whole area changed hands through the action of the two courts.

Though Ireland is without the stimulus to industry produced by an abundant supply of coal, yet with its great command of water power it might have widely developed its manufactures before the introduction of steam, had not special causes been in operation to check their progress. The unsatisfactory political and social relations of the country, and the unhappy legislation which had blighted its agriculture, would necessarily in any case have indirectly stunted its manufactures also; but, in addition to this, they were specially discouraged by various restrictive and repressive Acts. For a considerable period after the Anglo-Norman invasion Ireland was, however, in this respect placed on an entire equality with England, and in acts passed in the reigns of Edward I., Edward III., and Edward IV. is specially exempted from the duties or prohibitions imposed on foreign manufactures.

At an early period the woolen manufactures of Ireland were exported in considerable quantities to foreign countries. Considerable impulse was given to the manufacture in the reign of James I. by the establishment of a colony from the Palatinate, in Germany, at Carrick-on-Suir, but in the reign of Charles I. the clothing trade was discouraged by the earl of Strafford, lord-deputy, who, to prevent it interfering with that of England, endeavored to foster the linen manufacture instead. The act of the twelfth of Charles II., which prohibited the export of raw wool both from Ireland and England to foreign countries, was in the case of Ireland not only harmless but ineffectual; but, in addition to this, Ireland was virtually debarred from the English market by the heavy duties imposed on her woolen manufactures, and, being left out in the Navigation Act of 1663, she was also debarred from the colonial market. The foreign market was, however, left open to her; and after the prohibition of the export of Irish cattle to England the Irish farmer was led to turn his attention to the breeding of sheep, when not only did the woolen manufacture increase with great rapidity, but, owing to the superiority of the wool, the materials manufactured were of such a quality as to awaken the alarm of the English manufacturer, at whose instance both Houses of Parliament petitioned William III. to come to the rescue. In accordance with his wishes, the Irish parliament in 1698 imposed additional heavy duties on all woolen clothing with the exception of friezes exported out of Ireland, and in the following year an act was passed by the British Government prohibiting the export from Ireland of all woolen goods to any country save England, to any port in England save six, and from any town in Ireland save six. Sir William Petty in 1641 estimated the number of woolen workers and their wives at 30,000, but the result of these acts was so disastrous as practically to annihilate the manufacture, to reduce large districts and towns to the last verge of poverty, and seriously to cripple the revenues of the kingdom. Notwithstanding, however, that Ireland ceased to make even for her home supply any but the coarser articles, and was forced to import her finer goods from England, the acts were almost as injurious to the English as to the Irish manufacturer; for not only did many of the skilled Irish workmen settle in France, Spain and the Netherlands, but by means of smuggled Irish wool, to the extent of four-fifths of the Irish fleeces annually, the foreign manufacturer was able at a much smaller cost to fabricate materials quite equal to those of England, and for a time almost to swallow up her Turkey wool trade.

Between 1779 and 1782 the various acts which had hampered the woolen trade of Ireland were repealed or greatly modified; but, although a temporary impulse was thus given to the manufacture, the imprudent manner in which it was prosecuted and the influence of the remaining statutes led in the majority of cases to disappointment, and after a short period of deceptive prosperity, followed by failure and distress, the expansion of the trade was limited to the supply of the home market.

The linen manufacture of Ireland has suffered from legislation chiefly indirectly—from the trade restrictions which hampered the commerce of the country generally, and from the depressing influence of an unsatisfactory social system and unfavorable agricultural relations. At a very early period flax was to some extent cultivated in Ireland, and was both spun into thread, which was exported to foreign countries, and manufactured into cloth, which was made use of for cloaks, for the head-dresses for women, and for shrouds. The Earl of Stafford, lord-deputy in the reign of Charles I., with a view both to discourage the woolen manufacture of Ireland and to obtain for England a cheaper supply of linen than was to be had from France or Holland, as well as probably to benefit himself, invested as much as £30,000 ($150,000) of his fortune in the promotion of the linen trade, and not only imported flaxseed in large quantities from Holland, but offered premiums to induce skilled workmen from France and the Netherlands to settle in Ireland. A similar policy was vigorously prosecuted by his successor the duke of Ormond, who in 1665 procured the passage of an act by the Irish parliament to encourage the growth of flax and the manufacture of linen. In addition to this he dispatched persons to the Netherlands to obtain a knowledge of the best mode of manufacture, and he brought over a number of families from Brabant and others from France and Jersey, whom he settled at Carrick and at Chapelizod near Dublin, in both which places he established flourishing factories. Following the same line of policy, an act was passed by the English parliament inviting foreign workmen to settle in Ireland, and admitting all articles made of flax or hemp into England duty free, a privilege which, according to the report of the Irish House of Commons in 1774, gave Ireland an advantage over foreign nations of 25 per cent. In 1698 the Irish parliament, in answer to the representations of England, promised that they would "heartily endeavor to establish a linen and hempen manufacture," but this promise was at first only fulfilled by levying prohibitory duties on the exports of woolens.

The Linen Board ceased to act in 1830, the trade having since 1825 been in a very depressed condition owing to the importation of English and Scotch yarns made by machinery, which undersold the home-made article. A flax-spinning factory had indeed been erected at Cork in 1805, but appears to have been unsuccessful, and no further attempt to introduce machinery seems to have been made until after the discontinuance of the Linen Board, when an experiment on a large scale was made on the Bann near Belfast, from which period may be dated the rise of the great linen trade of Ulster, where, with the gradual disappearance of the hand spinning in the other provinces, nearly the whole linen manufacture of Ireland became concentrated. It is in the province of Ulster that flax is chiefly grown, but the soil has in many instances been much deteriorated by a too frequent rotation of the crop. The flax of Irish production in 1880 was estimated at 24,508 tons, of British production at 1,398, while the foreign imports of flax into the United Kingdom amounted to 94,812 tons. The cessation of the duties on exports from Ireland to Great Britain deprives us of the means of tracing the progress of the modern development of the linen industry. It was calculated that in 1855 the total exports of linen from Ireland to Great Britain and foreign countries was 106,000,000 yards, valued at £4,400,000 ($22,000,000), and undoubtedly since that period it has more than doubled. According to the report of the Flax Supply Association of Belfast for 1876, it was estimated that in 1875 the consumption of fiber in all the mills of Ireland was about 45,897 tons, or about one-seventh of that consumed by all the flax-mills in existence. It was also estimated that the total quantity of yarns produced per annum was 21,373,700 bundles, of which 10,479,040 were supposed to be manufactured into cloth by power-looms, and 5,850,000 by hand-looms, in addition to which about 2,000,000 bundles were supposed to be imported from Great Britain and the Continent, leaving for export 7,044,660 bundles—fully two-thirds of the production and imports into Ireland of yarn being converted into linen fabrics in Ireland. According to the report made to parliament in 1837, the number of workers employed in the flax factories of Ireland was 7,810, and according to the returns relating to factories for 1839, the number of mills engaged in the manufacture was forty, employing thirty-two steam engines with a horse-power of 928, and thirty-seven water-wheels with a horse-power of 1,052, the total number of persons employed being 9,017. In 1880 there were 1,182 scutching mills, a decrease of 317 as compared with 1871. The number of persons employed in the jute and hemp factories is over 1,000.

The cotton manufacture was introduced into Ireland in 1777, and a mill for spinning twist with water-power was erected in 1784. Under the protection of high import duties and bounties the manufacture increased with such rapidity that in 1800 it gave employment to 13,500 workers, chiefly in the neighborhood of Belfast. At the Union it was arranged that the duties, which then stood at 68 per cent. *ad valorem*, should remain unchanged for eight years, when they were gradually lowered by eight annual reductions, until in 1816 they stood at 8 per cent., and were shortly afterward abolished. The manufacture suffered greatly during the famine of 1846, and in 1850 the number of factories was only eleven, employing 2,937 persons. In 1861 the number had declined to nine, employing 2,734 persons, and, although in 1870 it had risen to fourteen, employing 4,157 persons, the check experienced during the American war has never been surmounted, the number of factories in 1874 being only eight, employing 3,075 persons, and in 1879 declining to six, employing 1,620 persons. For some time a large manufacture of lace and sewed muslin has been carried on in Ulster and some parts of Munster and Connaught—the sewed muslin trade being much the more extensive of the two. More than 300,000 persons, chiefly females, are employed in it, many of them being girls in the convent schools. Of late the trade has, however, been declining.

For several centuries Ireland has rivaled Scotland in the manufacture of whisky, the spirit of each country having its own special excellences. Camden states that in Ireland usquebaugh was much used to stop the fluxes and catarrhs caused by the excessive moisture of the climate, and that the Irish spirit was much "less heating and more drying" than that of England. An excise duty was first imposed on the manufacture in 1861, the rate charged being 4d. per gallon. This was raised in 1715 to 7d., and in 1717 to 8d. The amount of spirits produced by distillation avowedly illicit vastly exceeded that produced by the licensed distilleries. According to Wakefield, stills were erected even in the kitchens of baronets and in the stables of clergymen. More commonly they were placed in retired districts on loose stones, so as to be easily removable on the approach of the revenue officers.

There are breweries in most of the large towns of Ireland, and Dublin is celebrated for its porter. In 1888 the number of common breweries was fifty-three, and of licensed victualers 16,686, the malt consumed by the former being 3,965,887 and by the latter 1,864 bushels.

The fisheries of Ireland are of considerable economic importance, but have greatly diminished of late years. The salmon fisheries employ between 11,000 and 12,000 persons. The deep-sea and coast fisheries now employ only about 6,000 boats and 20,000 persons, whereas the numbers in 1860 were 13,483 and 55,630 respectively.

So far as natural advantages for commerce and shipping are concerned, Ireland is scarcely rivaled by any other country. Her coast is not only surrounded by safe anchorages, but the land is so deeply indented by bays and inlets, and so intersected by a network of internal navigation, that no part is more than twenty-four miles from water communication with the sea. In regard also to situation, it is difficult if not impossible to fix on a country whose circumstances are more favorable. Lying contiguous to the coast of Great Britain, and at some points almost touching it, she is nearer than that country to the West Indies, the continent of America, the west coast of France, the coasts of Spain and Portugal, and the ports of the Mediterranean. There is abundant evidence to show that Ireland was prepared to make use of these advantages, and that only impolitic trade restrictions have prevented her from developing a commerce which would undoubtedly have vied with that of Great Britain, but from which Great Britain would have gained more than she was in dread of losing. These restrictions, however, imposed when the great manufacturing industries of modern times were in their early infancy, not only snatched from her the possibility of commercial greatness, but, operating along with other legislation, doomed her to agricultural stagnation and centuries of poverty and distress; so that in fact contiguity to Great Britain has proved to be to her a bane rather than a blessing, and America, instead of affording her the means of enrichment, has only supplied her with an asylum for her poverty-stricken sons.

Revenue and Expenditure.—Until the time of Henry VIII. the English rule in Ireland was only nominal, except within a very small district; and, while statistics as to the revenue would thus be of little advantage for comparison with later times, they are not obtainable except in a very fragmentary manner.

From a variety of circumstances it is difficult to arrive at an approximate estimate of the wealth of Ireland; and there is no proper basis for a comparison with the other portions of the United Kingdom—among other reasons from the fact that by far the largest part of the wealth of Ireland is derived from agriculture.

The railway from Dublin to Kingston, which was opened in the end of 1834, was the first and for several years the only railway in Ireland. For a comparison with England and Scotland see ENGLAND; it will be observed that the proportion of traffic in relation to population is very much smaller in Ireland.

The great increase of population which began toward the close of last century, and continued during the first forty years of the present one, was due in various degrees to improvements in the political condition of the country, to the creation of leaseholds after the abolition of the forty shillings franchise, and to the prosperity caused by the productiveness of the potato and the high prices of produce during the war with France. The decrease from that period began at first with great rapidity, owing to the pressure of famine, and has been continuous up to the present time, chiefly owing to the creation of large pasturage farms.

The figures for 1841 indicate a density of population which is unparalleled, considering that it is so largely rural. The collective population in the parliamentary boroughs was 804,705 in 1841, 878,430 in 1851, 788,866 in 1861, 856,788 in 1871, and 892,505 in 1881. The increase of the urban population between 1841 and 1851, while there was a large decrease in the population generally, was apparently owing to a large temporary influx of the rural population into the towns, as in 1861 a large diminution had taken place, the increase of manufactures, however, causing the loss to be nearly recovered in 1871. Excluding the Dublin suburban townships of Rathmines (24,245) and Pembroke (23,184), there were only six towns whose population in 1881 was over 20,000.

Population of Ireland, 1659–1901.

	Pop.	According to		Pop.	According to
1659	500,091	Census return.	1792	4,088,226	Beaufort.
1672	1,320,000	Sir Wm. Petty.	1805	5,395,456	T. Newenham
1695	1,034,102	Capt. South.	1814	5,937,856	Parl. returns.
1725	1,669,644	Arthur Dobbs.	1821	6,801,827	Census commissioners
1731	2,010,221	Estab. clergy.			
1754	2,372,634	Tax collectors.	1831	7,767,401	"
1760	2,317,384	De Burgo.	1841	8,196,597	"
1767	2,544,276	Tax collectors.	1851	6,574,278	"
1777	2,690,556	"	1861	5,798,564	"
1785	2,845,932	"	1871	5,412,377	"
1788	4,040,000	G. P. Bushe.	1881	5,174.836	"
1791	4,206,612	Tax collectors.	1901	4,456,546	"

The population of Ireland has at various periods been considerably diminished by outbreaks of pestilence and by famine, but its decrease is chiefly attributable to emigration. Since 1847 this has been annually so great as to cause a continuous diminution of population. The census commissioners estimated the emigration between 1821 and 1831 at 70,000. The total number who emigrated between 1831 and 1841, according to information collected at the various ports, and corrected by comparison with other statistics, was 403,459 (with an addition of 10 per cent. on account of imperfect returns), the number who emigrated from Irish ports being 214,047, and from Liverpool 152,738. Information as to the destination of the emigrants for these years is available only in regard to those emigrating from Irish ports, the numbers who left for British America being 189,225, for the United States 19,775, for the Australian colonies 4,553, and for other destinations 494. The census commissioners of 1851 obtained information from the different ports of the United Kingdom regarding the numbers and destination of Irish emigrants from 1841 to 1855. The returns of emigration and immigration from and into the United Kingdom give full information regarding the destination of emigrants of Irish birth from 1853.

The influence of the great famine is very evident in the numbers emigrating between 1846 and 1852, the average being three times that of the preceding period, and more than double that of the period from 1853 to 1860. Although also the impulse toward emigration had begun even before 1846, and must be regarded as part of a general tendency toward emigration then prevalent in Europe, and especially in the United Kingdom, it was doubtless strengthened in Ireland by special circumstances which are still operating so as to cause an annual diminution of the population. The number who emigrated in 1841 was only 16,376, and in 1847 it rose to 215,444, more than double that of 1846. The highest number in any year was 249,721 in 1852, and the smallest since 1852 was 22,831 in 1877, the numbers increasing in 1879 to 41,296, and in 1880 to 93,641. This statement, however, gives the number of emigrants not from Ireland but from the United Kingdom, and of course includes many of Irish birth who had been for some time living in Great Britain.

More than two-thirds of those leaving Ireland for foreign countries emigrate directly to the United States, but to these must be added the large numbers who sail to Canadian ports, and journey thence by rail.

The usual theory that the poverty of the Irish is due to early marriages, or to the fact that a larger number marry than in Scotland or England, can be proved by statistics to be wholly unfounded. The average annual number for the ten years ending in 1879 of male minors married was only 2.65 per cent. of the total males married, and in the case of females the percentage was only 12.26, a much smaller proportion than in Great Britain; and in 1871 the proportion per cent. of the unmarried population above fifteen years was in Ireland—males 47.85, females 42.38, the proportion in England and Wales being 38.40 and 36.14 respectively, and in Scotland 44.41 and 42.23. In proportion to the number of married women between seventeen and fifty-five years of age, the number of births is very similar to that in Great Britain. The number of illegitimate births is very small, the yearly average for the last ten years being about 2.5 per cent. The proportion of the sexes born is about 106 males to 100 females.

The executive government is vested in a lord-lieutenant, assisted by a privy council, and by a chief secretary, who is a member of the House of Commons and frequently also a member of the cabinet. In the absence of the lord-lieutenant his functions are discharged by lord-justices, those generally appointed being the lord-chancellor and the commander of the forces. Each county is in charge of a lieutenant, a number of unpaid deputy-lieutenants and magistrates, and one or more resident paid magistrates, all appointed by the crown. The counties of cities and towns and the boroughs are governed by their own magistrates. The judicial establishment consists of the high court of chancery, the court of Queen's bench, common pleas, and exchequer, the landed estates court, and the probate and matrimonial court, which since 1877 constitute the high court of justice; the court of appeal; the high court of admiralty, which is to be abolished after the death of the present judge; and the court of bankruptcy and insolvency. The decisions of the court of appeal are subject to an appeal to the House of Lords. Assize courts are held in each county by two judges, for which purpose the country is divided into six circuits.

Ireland is represented in the imperial parliament by twenty-eight temporal peers elected for life and 103 commoners.

In Ireland there are four military districts, the headquarters of these being Dublin, Cork, Curragh, and Belfast respectively, and eight military subdistricts, with depôts at Downpatrick, Omagh, Armagh, Naas, Birr, Galway, Clonmel, and Tralee. The Irish militia consists of twelve regiments of artillery, twenty-one regiments of infantry, and fourteen rifle corps, numbering when embodied over 31,000 men and officers.

The parish constables of Ireland were in 1814 superseded in proclaimed districts by a peace preservation force, and in 1822 an Act was passed authorizing the formation of a constabulary force of 5,000 men, under an inspector-general for each province. In 1836 the entire force was amalgamated under one inspector-general. In all, it numbers between 10,000 and 12,000 men. In addition to the usual duties of policemen, the police are intrusted with the collection of statistics, the preservation of fish and game, and a variety of services connected with the local government. The average annual expense is a little over £1,000,000 ($5,000,000). In addition to this force there is the Dublin metropolitan police, consisting of about 1,100 officers and men, who are maintained at an annual cost of over £130,000 ($650,000), the expense borne by the Consolidated Fund being over £80,000 ($400,000).

According to the census returns of the commissioners of public instruction in 1834, there was a total population of 7,943,940 inhabitants, of whom 852,064 belonged to the Established Church, the number of Roman Catholics being 6,427,712, of Presbyterians 642,356, and of persons of other denominations 21,808. The population in 1901 was 4,456,546. Comment is unnecessary.

The Anglican Episcopal Church of Ireland constituted until 1871 an integral portion of one church, known as the Church of England and Ireland, and established by law in the two countries; but the Irish branch was disestablished and disendowed by an act which received the royal assent on July 26, 1869. According to this act, which came into execution on January 1, 1871, all church property became vested in a body of commissioners. All the state grants were to be resumed by the state, provision being made for vested interests, but the church was to receive possession of all endowments obtained from private sources since 1660. To all incumbents the income they formerly possessed was secured for life, minus the amount they might have paid for curates; and compensation was also granted to curates, parish clerks, and sextons, to Maynooth Roman Catholic College in lieu of the continuance of the annual parliamentary grant, and to the Presbyterians in lieu of the continuance of the grant called "Regium Donum."

The Roman Catholic Church is governed by four archbishops and twenty-seven bishops, the number of parish priests being nearly 1,000, and of administrative curates about 1,750. The ecclesiastical parishes amount to 1,084, and the churches and chapels number nearly 2,500. The Maynooth Roman Catholic College, which was founded in 1795, originally received an annual vote from government of £8,000, but latterly a grant from the consolidated fund of £26,360, which was commuted by the payment of £372,331.

The Presbyterian Church, which has its principal adherents in Ulster, was originally formed in 1642, and in 1840 a union took place of two divisions of the church which had formerly separated. Previous to the disestablishment of the Church of Ireland Presbyterians received for the support of their ministers an annual sum, first granted in 1672, of about £40,000, known as "Regium Donum," which was commuted by the Church Disestablishment Act.

The Methodist Church of Ireland was formed in 1878 by the union of the Wesleyan Methodists with the Primitive Wesleyan Methodists. The number of ministers connected with the conference in June, 1880, was 240, of whom 40 were supernumeraries. The number of principal stations under the charge of ministers was 135, embracing 373 chapels. The number of persons connected with the other denominations of Ireland is inconsiderable, amounting, in 1881, to only 0.8 per cent.

The number of persons in 1871 who could speak Irish only was 103,562, the number in 1841 being 319,602, and the number who could speak both Irish and English was 714,313 in 1871 and 1,204,684 in 1841.

According to the census of 1900 the number of schools for primary instruction was 8,684 with 770,622 pupils, of superior schools 574 with 21,225 pupils, of universities and colleges 13 with 2,945 students. The oldest university is that of Dublin, established in 1591 by a charter of Queen Elizabeth. The Catholic University, founded in 1854, has in operation faculties of medicine, philosophy and letters, and science. Queen's University, established in 1850, with colleges at Belfast, Cork, and Galway, has faculties of law, arts, medicine, and engineering. Queen's University has been superseded by the Royal University, for which a charter was granted in 1880. A royal college of science was established in 1867, with departments of mining, agriculture, engineering, and manufactures. The higher education of women is represented by Alexandra College, Dublin, founded in 1866, the Governess Association, the Ladies' Institution of Belfast, and the Queen's Institute for the instruction of women.

In 1811 a society was formed in Ireland for the education of the poor, which, from 1819, received the assistance of a grant of public money. This, however, was withdrawn in 1830 on account of the Roman Catholics refusing from religious objections to allow their pupils to enter the schools of the society. In 1833 the money formerly given to the society was vested in commissioners of public education, who in 1845 were incorporated under the name of the "Commissioners of National Education of Ireland."

HISTORY.—Circumstances were favorable in Ireland to the growth and preservation of ethnic legends. Among these favorable circumstances were the long continuance of tribal government, and the existence of a special class whose duty it was to preserve the genealogies of the ruling families, and keep in memory the deeds of their ancestors. Long pedigrees and stories of forays and battles were preserved, but under the necessary condition of undergoing gradual phonetic change according as the popular language altered. During many centuries there had been no conquest by foreign races to destroy these traditions; internal conquests and displacements of tribes confuse but do not eradicate traditions and pedigrees. When the Irish were converted to Christianity and became acquainted with the story of the deluge, the confusion of tongues, and the unity of the human race, the súide (sages) naturally endeavored to fill up the gap between their eponyms and Noah. The pedigrees now began to be committed to writing, and, as they could for the first time be compared with one another, a wide field was opened to the inventive faculties of the scribes. The result has been the construction of a most extraordinary legendary history, which, under the constant care of official súide, acquired a completeness, fullness, and a certain degree of consistency which is wonderful. In the eleventh and twelfth centuries this legendary history was fitted with a chronology, and synchronized with the annals of historical nations.

With all their drawbacks, the Irish ethnic legends, when stripped of their elaborate details and Biblical and classical loans, express the broad facts of the peopling of Ireland, and are in accordance with the results of archæological investigation. At the earliest period the country was well wooded, and the interior full of marshes and lakes; it was occupied by a sparse population, who appear in later times as "forest tribes" (Tuatha Feda), and were, doubtless, of the aboriginal (Iberic) race of western and southern Europe. The story of Partholan represents the incoming of the first bronze-armed Celts, who were a Goidelic tribe akin to the later Scots that settled on the seacoast, and built the fortresses occupying the principal headlands. They formed, with the forest tribes, the basis of the population in the Early Bronze age. Afterward came the various tribes known by the general name of Firbolgs. It is not necessary to suppose that all the tribes included under this name came at the same time, or even that they were closely akin. The legend names several tribes, and tells us that they came into Ireland at different places from Britain. The effect of their immigrations now appear to have been that in the north the people were Cruithni, or Picts of the Goidelic branch of the Celts; in the east and center, British and Belgic tribes; and in Munster, when not distinctly Iberic, of a southern or Gaulish type.

The opening of the historic period was marked by a great struggle of tribes, which took place about the beginning of the Christian era, and of which Irish annalists have left us but very scanty information, and that confused and misleading. This struggle was brought about by the arrival from abroad of a new tribe, or the rise of an old one. The former view seems the more probable, for at that time great displacements of the Celts were taking place everywhere consequent on the conquests of the Romans, and some of the displaced tribes may have migrated to Ireland. The victors in the struggle appear afterward as Scots; the conquered tribes are called *Aithech Tuatha*, that is, vassal tribes, because they paid *daer* or base rent.

In the beginning of the fourth century there was an organized Christian church in Britain, for there were British bishops at the council of Arles in 314 A.D., one of whom was probably from Wales. At that time the Irish had possession of many places in west and south Britain, and must have come in contact with Christians. These were more numerous and the church better organized in south Wales and southwest Britain, where the Munster or southern Irish were, than in north Wales, held by the Scots proper. Christianity may have therefore found its way into Munster some time in the fourth century. There is a story of four bishops who, with several priests and anchorites, lived in Munster before the mission of St. Patrick, which was credited by such high authorities as Colgan and Ussher, but later inquiries have shown that most if not all these either were contemporaries of St. Patrick or belonged to a later time. But, although it is almost certain that no organized church existed in Ireland before the mission of St. Patrick, there may have been several scattered communities in the south of Ireland. According to Constantius of Lyons, the contemporary and biographer of Germanus, the British bishops, alarmed at the rapid progress of Pelagianism in Britain, sought the aid of the Gaulish Church; a numerous synod summoned for the occasion commissioned Germanus and Lupus to go to Britain, which they accordingly did in 429, according to the usual reckoning. Prosper of Aquitaine on the other hand attributes the mission of Germanus to the pope, and makes no mention of the action of the Gaulish bishops; but he adds that it was done through the action of the deacon Palladius. There is nothing inconsistent in the two accounts, for the acts of the council were probably sent to the pope by a special messenger, who was Palladius. The latter was probably a Briton, but of the Gaulish family of the Palladii. Ammianus Marcellinus mentions a Palladius holding high office in Britain in the middle of the fourth century. Palladius was probably the envoy of the British bishops both to Gaul and to the pope. If he was a Briton, he would naturally have been anxious for the conversion of the Irish as the most effectual way of stopping the Scotic incursions, and was therefore a fitting person to be selected for such a mission. Our information about Palladius is derived from the various lives of St. Patrick, of which seven have been printed by Colgan.

The death of Palladius is assumed to have taken place in 431, and the mission of St. Patrick to have begun in the following year. Our knowledge of the Irish apostle is, however, so contradictory and unsatisfactory that no reliance can be placed on any dates connected with him. In any case, when we remember the time and the state of Europe, it is not at all likely that the place of Palladius could be so rapidly supplied as the above dates make out. While there are many lives of the saint, these are rather legendary than historical biographies (see PATRICK). But although there is much obscurity and confusion in the acts of St. Patrick, there cannot be the slightest doubt of his real existence. He was thoroughly acquainted with the people of Ireland, and consequently knew that he should secure the chief in order to succeed with the clan, and this is what he did. At first the conversion was only apparent, but, although the mass of the people still continued practically pagans, the apostle was enabled to found churches and schools, and educate a priesthood, and thus provide the most effective and certain means of converting the whole people. He was, undoubtedly, a great missionary, full of zeal, but withal prudent, and guided by much good sense. The learned Tillemont, judging Patrick by the writings attributed to him, truly says that he had much of the character of St. Paul, and was well read in Scripture.

The church founded by St. Patrick was identical in doctrine with the churches of Britain and Gaul, and other branches of the Western Church. There is no evidence that the Pelagian heresy found an entrance there, and least of all is there the slightest foundation for the supposition that it had any connection with the Eastern Church. Its organization was, however, peculiar; and, as countries in the tribal state of society are very tenacious of their customs, the Irish Church preserved these peculiarities for a long time, and carried them into other countries, by which the Irish were brought into direct collision with a different and more advanced church organization. Wherever the Roman law and municipal institutions had been in force, the church society was modeled on the civil one.

From the beginning the church of St. Patrick was monastic, as is proved by a passage in his *Confessio*, where, speaking of the success of his mission, he says: "The sons of Scots and daughters of chiefs appear now as monks and virgins of Christ, especially one blessed Scottish lady of noble birth and of great beauty who was adult, and whom I baptized." But the early Irish monasticism was unlike that known at a later period. An Irish cœnobium of the earliest type was simply an ordinary sept or family whose chief had become Christian, and making a gift of his land either retired leaving it in the hands of a comarba, or remained as the religious head himself. The family went on with their usual avocations, but some of the men and women, and in some cases all, practiced celibacy, and all joined in fasting and prayer. These communities offer many striking analogies with the Shaker communities of the United States. A severer and more exclusive system of monasticism succeeded this primitive one, but its general character never entirely changed.

From the nature of the organization of the Irish Church as established by St. Patrick, it was to be expected that on his death the bond between the numerous church families which his great authority supplied would be greatly relaxed. The Druidic orders, too, which there is reason to believe remained still to a large extent pagan, and undoubtedly practiced many of their arts even in the seventh century, must have regained much of their old power. A tradition exists that at the instance of St. Patrick the laws were purified by a commission of which he himself was a member, and collected into a body called the Senchas Mór. Nevertheless the pagan marriage customs were practiced long after St. Patrick's time.

The encroachments of the Saxons which forced the Cymri of the north into Wales, and the consequent driving out of the Irish from their possessions in Wales and southwest Britain, and the desolation and anarchy of the whole country, appear to have caused many British ecclesiastics to seek a refuge in Ireland, among whom was Gildas, who is said to have been invited over by King Ainmire. But, whether as an invited guest or as a refugee, Gildas certainly helped to reform the Irish Church, at least of Leth Cuind, or Cond's Half. During this period the energy of the youth of Ireland seems to have concentrated itself on religious asceticism and missionary work. St. Columcille converted the Picts, and, from his monastery of Hí, went forth the illustrious Aidan to plant another Iona at Lindisfarne, which, as Mr. Hill Burton, the historian of Scotland, says, "long after the poor parent brotherhood had fallen to decay, expanded itself into the bishopric of Durham, or, as some will have it, the archbishopric of York itself; for, of all the Christian missions to England, that of Aidan seems to have taken the firmest root." This was also the period of the great missionaries of the Continent, Columbanus, Gall, Killian, and many others. Nor had the old daring on the sea, which distinguished the Scotic adventurers who had ravaged the coast of Britain, and which still characterizes the Celtic fishermen of the west of Scotland, the Isle of Man, Cornwall and Brittany, and the colony of Newfoundland, died out among the Gael of South Munster, for, besides St. Brendán, whose voyages have given rise to a widespread myth, there was another navigator, Cormac, a disciple of St. Columcille, who visited the Orkneys, and discovered the Faroe Islands and Iceland, long before the Northmen set foot on them. Other Irishmen, seeking remote places to lead there the lives of anchorites, followed in their tracks, and, when the Northmen first discovered Iceland, they found there books and other traces of the Irish of the early church.

The history of Ireland's connection with ENGLAND (*q.v.*) dates from the middle of the twelfth century.

Nicholas Breakspeare, known in history as Hadrian IV., was the only Englishman who ever filled the papal chair. He granted a bull to Henry II. in 1155 which contains this passage:—"There is no doubt, and your nobility acknowledges, that Ireland and all islands upon which Christ the Sun of righteousness has shone, and which have received the teachings of the Christian faith, rightfully belong to the blessed Peter and the most holy Roman Church." Believing that Henry was likely to use his power for the good of religion and of the church, he granted Ireland to him, reserving all ecclesiastical rights, and making one penny from each house payable yearly to St. Peter.

In 1156 Dermod MacMurrough, deposed for his tyranny from the kingdom of Leinster, repaired to Henry in Aquitaine. The king was busy with the French, but gladly seized the opportunity of asserting his claim, and gave Dermod a letter authorizing him to raise forces in England. Thus armed, and provided with gold extorted from his former subjects in Leinster, Dermod went to Bristol and sought the acquaintance of Richard de Clare, a Norman noble of great ability but broken fortunes. Earl Richard, whom later usage has named Strongbow, agreed to reconquer Dermod's kingdom for him. The stipulated consideration was the hand of Eva, his only child, and according to feudal law his sole heiress, to whose issue lands and kingdoms would naturally pass. But Irish customs admitted no estates of inheritance, and Eva had no more right to the reversion of Leinster than she had to that of Japan. It is likely that Strongbow had no conception of this, and that his first collision with the tribal system was an unpleasant surprise. Passing through Wales, Dermod agreed with Robert Fitzstephen and Maurice Fitzgerald to invade Ireland in the ensuing spring.

About May 1, 1169, Fitzstephen landed on the Wexford shore with a small force, and next day Maurice de Prendergast brought another band nearly to the same spot. Dermod joined them, and the Danes of Wexford soon submitted. According to agreement Dermod granted the territory of Wexford, which had never belonged to him, to Robert and Maurice and their heirs forever. And here begins the conflict between feudal and tribal law, which was destined to deluge Ireland in blood. Maurice Fitzgerald soon followed with a fresh detachment. About a year after the first landing Raymond Le Gros was sent over by Earl Richard with his advanced guard, and Strongbow himself landed near Waterford on August 23, 1170, with 200 knights and about 1,000 other troops.

The natives did not understand that this invasion was quite different from those of the Danes. They made alliances with the strangers to aid them in their intestine wars, and the annalist writing in later years (*Annals of Lough Cé*) describes with pathetic brevity the change wrought in Ireland: "Earl Strongbow came into Erin with Dermod MacMurrough to avenge his expulsion by Roderick, son of Turlough O'Connor; and Dermod gave him his own daughter and a part of his patrimony, and Saxon foreigners have been in Erin since then."

While waiting for Strongbow's arrival, Raymond and Hervey were attacked by the Waterford Danes, whom they overthrew. Seventy prisoners were thrown over a cliff into the sea. Strongbow himself took Waterford and Dublin, and the Danish inhabitants of both readily combined with their French-speaking kinsfolk, and became firm supporters of the Anglo-Normans against the native Irish.

Alarmed at the principality forming near him, Henry invaded Ireland in person, having first had Hadrian's grant confirmed by Alexander III., so as to gain the support of the Irish clergy. He landed near Waterford October 18, 1172. Giraldus says he had 500 knights and many other soldiers; Regan, the metrical chronicler, says he had 4,000 men, of whom 400 were knights; the *Annals of Lough Cé* that he had 240 ships. The Irish writers tell little about these great events, except that the king of the Saxons took the hostages of Munster at Waterford, and of Leinster, Ulster, Thomond, and Meath at Dublin. They did not take in the grave significance of doing homage to a Norman king, and becoming his "man."

The mail-clad knights were not uniformly successful against the natives, but they generally managed to occupy the open plains and fertile valleys. Geographical configuration preserved centers of resistance—the O'Neills in Tyrone and Armagh, the O'Donnells in Donegal, and the Macarthies in Cork being the largest tribes that remained practically unbroken. On the coast from Bray to Dundalk, and by the navigable rivers of the east and south coasts, the Norman put his iron foot firmly down.

Henry granted Meath, about 800,000 acres, to Hugo de Lacy, reserving scarcely any prerogative to the crown, and making his vassal almost independent.

There is a vague tradition that Edward I. visited Ireland about 1256, when his father ordained that the prince's seal should have regal authority in that country. A vast number of documents remain to prove that he did not neglect Irish business. Yet this great king cannot be credited with any specially enlightened views as to Ireland.

Outwardly all seemed fair. The De Burghs were supreme in Connaught, and English families occupied eastern Ulster. The fertile southern and central lands were dominated by strong castles. But Tyrone and Tyrconnel, and the mountains everywhere, sheltered the Celtic race, which, having reached its lowest point under Edward I., began to recover under his son.

In 1315, the year after Bannockburn, Edward Bruce landed near Larne with 6,000 men, including some of the best knights in Scotland. Supported by O'Neill and other chiefs, and for a time assisted by his famous brother, Bruce gained many victories. The Scots ranged at will over great part of Ireland, but the brothers never took Dublin, though they came as near it as Castleknock. There was no general effort of the natives in their favor; perhaps the Irish thought one Norman no better than another, and their total incapacity for national organization forbade the idea of a native sovereign. The family quarrels of the O'Connors at this time, and their alliances with the Burkes, or De Burghs, and the Birminghams, may be traced in great detail in the annalists—the general result being fatal to the royal tribe of Connaught, which is said to have lost 10,000 warriors in the battle of Templetogher. In other places the English were less successful, the Butlers being beaten by the O'Carrolls in 1318, and Richard de Clare falling about the same time in the decisive battle of Dysert O'Dea. The O'Briens reëstablished their sway in Thomond, and the illustrious name of De Clare disappears from Irish history. Edward Bruce fell in battle near Dundalk, most of his army recrossing the channel, and leaving behind a reputation for cruelty and rapacity. Indeed, the invaders were generally hated, and have had little thanks either from Irish or colonial chroniclers. The colonists were victorious, but their organization was undermined, and the authority of the crown, which had never been able to keep the peace, grew rapidly weaker. Within twenty years after the great victory of Dundalk, the quarrels of the barons allowed the Irish to recover much of the land they had lost.

The brilliant reign of Henry V. was a time of extreme misery to the colony in Ireland. Half the English-speaking people fled to England, where they were not welcome.

The disastrous reign of the third Lancastrian completed the discomfiture of the original colony in Ireland. Quarrels between the Ormonde and Talbot parties paralyzed the government, and a "Pale" of thirty miles by twenty was all that remained. Even the walled towns, Kilkenny, Ross, Wexford, Kinsale, Youghal, Clonmel, Kilmallock, Thomastown, Fethard, and Cashel were almost starved out; Waterford itself was half ruined and half deserted. Only one parliament was held for thirty years, but taxation was not remitted on that account. No viceroy even pretended to reside continuously. The north and west were still worse off than the south.

Occupied in pleasure or foreign enterprise, Henry VIII. at first paid little attention to Ireland. The royal power was practically confined to what in the previous century had become known as the "Pale," that is, Dublin, Louth, Kildare, and a part of Meath, and within this narrow limit the earls of Kildare were really more powerful than the crown. Waterford, Drogheda, Dundalk, Cork, Limerick, and Galway were not Irish, but rather free cities than an integral part of the kingdom; and many inland towns were in the same position. The house of Ormonde had created a sort of small Pale about Kilkenny, and part of Wexford had been colonized by men of English race. The Desmonds were Irish in all but pride of blood. The Barretts, Condons, Courcies, Savages, Arundels, Carews, and others had disappeared or merged in the Celtic mass. Anglo-Norman nobles became chiefs of pseudo-tribes, which acknowledged only the Brehon law, and paid dues and services in kind. These pseudo-tribes were often called "nations," and a vast number of exactions were practiced by the chiefs. "Coyne and livery"—the right of free quarters for man and beast—arose among the Anglo-Normans, and became more oppressive than any native custom. When Henry took to business, he laid the foundation of reconquest. The house of Kildare, which had actually besieged Dublin (1534), was overthrown, and the Pale saved from a standing danger. But the Pale scarcely extended twenty miles from Dublin, a March of uncertain width intervening between it and the Irish districts. Elsewhere, says an elaborate report, all the English folk were of "Irish language and Irish condition," except in the cities and walled towns. Down and Louth paid black rent to O'Neill, Meath and Kildare to O'Connor, Wexford to the Kavanaghs, Kilkenny and Tipperary to O'Carroll, Limerick to the O'Briens, and Cork to the McCarthies. McMurrough Kavanagh, in Irish eyes the representative of king Dermod, received an annual pension from the exchequer. Henry set steadily to work to reassert the royal title. He assumed the style of king of Ireland, so as to get rid of the notion that he held the island of the pope. The Irish chiefs acknowledged his authority and his ecclesiastical supremacy, abjuring at the same time that of the Holy See. The lands of the earl of Shrewsbury and other absentees, who had performed no duties, were resumed; and both Celtic and feudal nobles were encouraged to come to court. Here begins the long line of official deputies, often men of moderate birth and fortune. Butler and Geraldine, O'Neill and O'Donnell, continued to spill each other's blood, but the feudal and tribal systems were alike doomed. In the names of these Tudor deputies and other officers we see the origin of many great Irish families—Skeffington, Brabazon, St. Leger, Fitzwilliam, Wingfield, Bellingham, Carew, Bingham, Loftus, and others. Nor were the Celts overlooked. O'Neill and O'Brien went to London to be invested as earls of Tyrone and Thomond respectively. O'Donnell, whose descendants became earls of Tyrconnel, went to court and was well received. The pseudo-chief McWilliam became earl of Clanricarde, and others reached lower steps in the peerage, or were knighted by the king's own hand. All were encouraged to look to the crown for redress of grievances, and thus the old order slowly gave place to the new.

The moment when Protestantism and Ultramontanism are about to begin their still unfinished stuggle is a fit time to notice the chief points in Irish church history. Less than two years before Strongbow's arrival Pope Eugenius had established an ecclesiastical constitution in Ireland depending on Rome, but the annexation was very imperfectly carried out, and the hope of fully asserting the Petrine claims was a main cause of Hadrian's gift to Henry II. It is a reproach to England that after four centuries Ireland was still without a university. Attempts to found one at Dublin (1311) or Drogheda (1465) failed for want of funds. The work was partially done by the great abbeys, boys of good family being brought up by the Cistercians of Dublin and Jerpoint, and by the Augustinians of Dublin, Kells, and Conall, and girls by the canonesses of Gracedieu. A strong effort was made to save these six houses, but Henry VIII. would not hear of it, and there was no Irish Wolsey partially to supply the king's omissions.

Ample evidence exists that the Irish Church was full of abuses before the movement under Henry VIII. We have detailed accounts of three sees—Clonmacnoise, Enaghdune, and Ardagh. Ross, also in a wild district, was in rather better case. But even in Dublin strange things happened; thus the archiepiscopal crozier was in pawn for eighty years from 1449. The morals of the clergy were no better than in other countries, and we have evidence of many scandalous irregularities. Where his hand reached Henry had little difficulty in suppressing the monasteries or taking their lands, which Irish chiefs swallowed as greedily as men of English blood. But the friars, though pretty generally turned out of doors, were themselves beyond Henry's power, and continued to preach everywhere among the people. Their devotion and energy may be freely admitted; but the mendicant orders, especially the Carmelites, were not uniformly distinguished for morality. Monasticism was momentarily suppressed under Oliver Cromwell; but the Restoration brought them back to their old haunts. The Jesuits, placed by Paul III. under the protection of Con O'Neill, "prince of the Irish of Ulster," came to Ireland toward the end of Henry's reign, and helped to keep alive the Roman tradition. It is not surprising that Anglicanism—the gospel light that dawned from Boleyn's eyes—recommended by such prelates as Browne and Bale, should have been regarded as a symbol of conquest and intrusion. The Four Masters thus describe the Reformation:—"A heresy and new error arising in England, through pride, vainglory, avarice, and lust, and through many strange sciences, so that the men of England went into opposition to the pope and to Rome." The destruction of relics and images and the establishment of a schismatic hierarchy is thus recorded:—"Though great was the persecution of the Roman emperors against the church, scarcely had there ever come so great a persecution from Rome as this." Such was Roman Catholic opinion in Ireland in the sixteenth century, and such it is still. In vulgar Irish the word "Sassenagh" denotes a Protestant as well as an Englishman.

The English Government long hesitated about the official establishment of Protestantism, and the royal order to that effect was withheld until 1551. Copies of the new liturgy were sent over, and St. Leger had the communion service translated into Latin, for the use of priests and others who could read, but not in English. The popular feeling was strong against innovation. The Reformation having made no real progress, Mary found it easy to restore the old ways. Dowdall was restored; Browne, Staples, and others were deprived.

Bale fled for bare life, and his see was treated as vacant. Yet the queen found it impossible to restore the monastic lands, though she showed some disposition to scrutinize titles of grantees. She was Tudor enough to declare her intention of maintaining the old prerogatives of the crown against the Holy See, and assumed the royal title without papal sanction. Paul IV. was fain to curb his fiery temper, and to confer graciously what he could not withhold. English Protestants fled to Ireland to escape the Marian persecution; but respectable evidence exists to show that, had the reign continued a little longer, Dublin would have been no safe place of refuge.

Mary scarcely varied the civil policy of her brother's ministers. Gerald of Kildare was restored to his earldom. The plan of settling Leix and Offaly by dividing the country between colonists and natives holding by English tenure failed, owing to the unconquerable love of the people for their own customs. But resistance gradually grew fainter, and we hear little of the O'Connors after this. The O'Mores, reduced almost to brigandage, gave trouble till the end of Elizabeth's reign, and a member of the clan was chief contriver of the rebellion of 1641. Maryborough and Philipstown, King's county and Queen's county, commemorate Mary's ill-starred marriage.

Anne Boleyn's daughter succeeded quietly, and Sir Henry Sidney was sworn lord-justice with the full Catholic ritual. When Sussex superseded him as lord-lieutenant, the litany was chanted in English, both cathedrals having been painted, and Scripture texts substituted for "pictures and popish fancies." At the beginning of 1560 a parliament was held which restored the ecclesiastical legislation of Henry and Edward. In two important points the Irish Church was made more dependent on the state than in England: *congés d'élire* were abolished, and heretics made amenable to royal commissioners or to parliament without reference to any synod or convocation. According to a contemporary list, this parliament consisted of three archbishops, seventeen bishops, twenty-three temporal peers, and members returned by ten counties and twenty-eight cities and boroughs. We know not whether all were present, and therefore the list throws no light on the dispute as to the conformity of Irish bishops in possession at Elizabeth's accession. A careful scrutiny shows that Curwen of Dublin and O'Fihily of Leighlin actually conformed. Bodkin of Tuam, De Burgh of Clonfert, and perhaps some others took the oath of supremacy; but the English convocation under Henry VIII. had done no less, and it involved no doctrinal changes. Walsh of Meath, Leverous of Kildare, and probably Thonory of Ossory, were deprived. In other cases Elizabeth connived at what she could not prevent, and hardly pretended to enforce uinformity except in the Pale and in the large towns.

Ulster demanded the immediate attention of Elizabeth. Shane O'Neill maintained a contest, which had begun under Mary, until 1567, with great ability and a total absence of morality, in which Sussex had no advantage over him. The lord-lieutenant twice tried to have Shane murdered; once he proposed to break his safe-conduct; and he held out hopes of his sister's hand as a snare. Shane was induced to visit London, where his strange appearance and followers caused much amusement, and where he spent his time intriguing with the Spanish ambassador and making himself agreeable to Lord Robert Dudley. The government detained him rather unfairly, and the young baron of Dungannon suffered his father's fate, leaving a brother who at last gained the coveted earldom, and became a more dangerous enemy to England than ever Shane had been. Sussex was outmatched both in war and diplomacy; the loyal chiefs were crushed one by one; and the English suffered checks of which the moral effect was ruinous. Shane always fully acknowledged Elizabeth as his sovereign, and sometimes played the part of a loyal subject, wreaking his private vengeance under color of expelling the Scots from Ulster. At last, in 1566, the queen placed the sword of state in Sidney's strong grasp. Shane was driven helplessly from point to point, and perished miserably at the hands of the McDonnells, whom he had so often oppressed and insulted.

Peace was soon broken by disturbances in the south. The earl of Desmond having shown rebellious tendencies was detained for six years in London. Treated leniently, but grievously pressed for money, he tried to escape, and, the attempt being judged treasonable, he was persuaded to surrender his estates—to receive them back or not at the queen's discretion. Seizing the opportunity, English adventurers proposed to plant a military colony in the western half of Munster, holding the coast from the Shannon to Cork harbor. Some who held obsolete title deeds were encouraged to go to work at once by the example of Sir Peter Carew, who had established his claims in Carlow. Carew's title had been in abeyance for a century and a half, yet most of the Kavanaghs attorned to him. Falling foul of Ormonde's brothers, seizing their property and using great cruelty and violence, Sir Peter drove the Butlers, the only one among the great families really loyal, into rebellion. Ormonde, who was in London, could alone restore peace; all his disputes with Desmond were at once settled in his favor, and he was even allowed to resume the exaction of coyne and livery, the abolition of which had been the darling wish of statesmen. The Butlers returned to their allegiance, but continued to oppose Carew, and great atrocities were committed on both sides. Sir Peter had great but undefined claims in Munster also, and the people there took warning. His imitators in Cork were swept away. Sidney first, and after him Humphrey Gilbert, could only circumscribe the rebellion. Toward the end of 1575 Sidney was again persuaded to become viceroy. The Irish recognized his great qualities, and he went everywhere without interruption. Henceforth presidencies became permanent institutions. Drury in Munster hanged four hundred persons in one year, Malby in reducing the Connaught Burkes spared neither young nor old, and burned all corn and houses. The Desmonds determined on a great effort. A holy war was declared. Fitzmaurice landed in Kerry with a few followers, and accompanied by the famous Nicholas Sanders, who was armed with a legate's commission and a banner blessed by the pope. Fitzmaurice fell soon after in an encounter with Malby, but Sanders and Desmond's brothers still kept the field. When it was too late to act with effect, Desmond himself, a vain man, neither frankly loyal nor a bold rebel, took the field. He surprised Youghal, then an English town, by night, sacked it, and murdered the people. Roused at last, Elizabeth sent over Ormonde as general of Munster, and after long delay gave him the means of conducting a campaign. "I will merely," wrote Burghley, "say Butler Aboo against all that cry in a new language Papa Aboo." It was in fact as much a war of Butlers against Geraldines as of loyal subjects against rebels, and Ormonde did his work only too well. Lord Baltinglass raised a hopeless subsidiary revolt in Wicklow (1580), which was signalized by a crushing defeat of Lord-Deputy Grey (Arthegal) in Glenmalure. A force of Italians and Spaniards landing at Smerwick in Kerry, Grey hurried thither, and the foreigners, who had no commission, surrendered at discretion, and were put to the sword. Neither Grey nor the Spanish ambassador seems to have seen anything extraordinary in thus disposing of inconvenient prisoners. Spenser and Raleigh were present. Sanders perished obscurely in 1581, and in 1583 Desmond himself was hunted down and killed in the Kerry mountains. More than 500,000 Irish acres were forfeited to the crown. The horrors of this war it is impossible to exaggerate. The Four Masters say that the lowing of a cow or the voice of a plowman could scarcely be heard from Cashel to the furthest point of Kerry; Ormonde, who, with all his severity, was honorably distinguished by good faith, claimed to have killed 5,000 men in a few months. Spenser, an eyewitness, says famine slew far more than the sword.

In 1584 Hugh O'Neill, if O'Neill he was, became chief of part of Tyrone; in 1587 he obtained the coveted earldom, and in 1593 was the admitted head of the whole tribe. A quarrel with the government was inevitable, and, Hugh Roe O'Donnell having joined him, Ulster was united against the crown. In 1598 James Fitzthomas Fitzgerald assumed the title of Desmond, to which he had some claims by blood, and which he pretended to hold as Tyrone's gift. Tyrone had received a crown of peacock's feathers from the pope, who was regarded by many as king of Ireland. The title of *Sugan* or straw-rope earl has been generally given to the Desmond pretender. Both ends of the island were soon in a blaze, and the Four Masters say that in seventeen days there was not one son of a Saxon left alive in the Desmond territories. Edmund Spenser lost his all, escaping only to die of misery in a London garret. Tyrone more than held his own in the north, completely defeated Sir H. Bagenal in the battle of the Yellow Ford (1598), invaded Munster, and ravaged the lands of Lord Barrymore, who had remained true to his allegiance. Tyrone's ally, Hugh Roe O'Donnell, overthrew the president of Connaught. "The Irish of Connaught," say the Four Masters, "were not pleased at Clifford's death; * * he had never told them a falsehood." Essex came over in 1599 with a great army, but did nothing of moment, was outgeneraled and outwitted by Tyrone, and threw up his command to enter on the mad and criminal career which led to the scaffold. In 1600 Sir George Carew became president of Munster, and, as always happens when the crown was well served, the rebellion was quickly put down. Mountjoy, who succeeded Essex, joined Carew, and a Spanish force which landed at Kinsale surrendered. The destruction of their crops starved the people into submission, and the contest was only less terrible than the first Desmond war because it was much shorter. In Ulster Mountjoy was assisted by Sir Henry Docwra, who founded the second settlement at Derry, the first under Randolph having been abandoned. Hugh O'Donnell sought help in Spain, where he died. Tyrone submitted at last, craving pardon on his knees, renouncing his Celtic chiefry, and abjuring all foreign powers, but still retaining his earldom, and power almost too great for a subject.

Great things were expected of James I. He was Mary Stuart's son, and there was a curious antiquarian notion afloat that, because the Irish were the original "Scoti," a Scottish king would sympathize with Ireland. Corporate towns set up the mass, and Mountjoy, who could argue as well as fight, had to teach them a sharp lesson. Finding Ireland conquered and in no condition to rise again, James established circuits and a complete system of shires. Sir John Davies was sent over as solicitor-general. The famous book in which he glorifies his own and the king's exploits gives far too much credit to the latter, and far too little to his great predecessor. When she was still alive to confer favors, Davies in very creditable verse had lavished praises upon Elizabeth which must have seemed exaggerated even to her.

Two legal decisions swept away the customs of tanistry and of Irish gavelkind, and the English land system was violently substituted. Tyrone was harassed by sheriffs and other officers, and the government, learning that he was engaged in an insurrectionary design, prepared to seize him. Tyrone, Donegal, Armagh, Cavan, Fermanagh, and Derry were parceled out among English and Scotch colonists, portions being reserved to the natives. The site of Derry was granted to the citizens of London, who fortified and armed it, and Londonderry became the chief bulwark of the colonists in two great wars.

It may be convenient to notice here the parliamentary history of the English colony in Ireland, which corresponds pretty closely with that of the mother country. First there are informal meetings of eminent persons; then, in 1295, there is a parliament, of which some acts remain, and to which only knights of the shire were summoned to represent the commons. Burgesses were added as early as 1310. The famous parliament of Kilkenny in 1367 was largely attended, but the details of its composition are not known. The most ancient Irish parliament remaining on record was held in 1374, twenty members in all being summoned to the House of Commons, from the Counties of Dublin, Louth, Kildare, and Carlow, the liberties and crosses of Meath, the City of Dublin, and the towns of Drogheda and Dundalk. Elizabeth's first parliament, held in 1559, was attended by 76 members of the lower house, which increased to 122 in 1585. In 1613 James I. by a wholesale creation of new boroughs, generally of the last insignificance, increased the House of Commons to 232, and thus secured an Anglican majority to carry out his policy. He told those who remonstrated to mind their own business. In 1639 the House of Commons had 274 members, a number which was further increased to 300 at the Revolution, and so it remained until the Union.

The necessities of Charles I. induced his ministers to propose that a great part of Connaught should be declared forfeited, owing to mere technical flaws in title, and planted like Ulster. Such was the general outcry that the scheme had to be given up; and, on receiving a large grant from the Irish parliament, the king promised certain graces, of which the chief were security for titles, a free trade, and the substitution of an oath of allegiance for that of supremacy. Having got the money, Charles as usual broke his word; and in 1635 Lord Deputy Strafford began a general system of extortion. The Connaught and Munster landowners were shamelessly forced to pay large fines for the confirmation of even recent titles. The Irish woolen manufacture was discouraged as hurtful to England; and, if linen was encouraged, it was only because no linen was made in the greater kingdom. The money obtained by oppressing the Irish nation was employed to create an army for the oppression of the Scotch and English nations. The Catholic insurgents of 1641 just failed to seize Dublin, but quickly became masters of nearly the whole country. That there was no definite design of massacreing the Protestants is likely, but it was intended to turn them out. Great numbers were killed, often in cold blood and with circumstances of great barbarity. The English under Coote and others retaliated. In 1642 a Scottish army under Monro landed in Ulster, and formed a rallying point for the colonists. Londonderry, Enniskillen, Coleraine, Carrickfergus, and some other places defied Sir Phelim O'Neill's tumultuary host.

Trained in foreign wars, Owen Roe O'Neill gradually formed a powerful army among the Ulster Irish, and it is impossible to overestimate his skill and patience. But like other O'Neills, he did little out of Ulster, and his great victory over Monro (1645) had no lasting results. The old English of the Pale were forced into rebellion, but could never get on with the native Irish, who hated them only less than the new colonists. Ormonde throughout maintained the position of a loyal subject, and, as the king's representative, played a great but hopeless part. The Celts cared nothing for the king except as a weapon against the Protestants; the old Anglo-Irish Catholics cared much, but the nearer Charles approached them the more completely he alienated the Protestants.

In all their negotiations with Ormonde and Glamorgan, Henrietta Maria and Digby, the pope and Rinuccini stood out for an arrangement which would have destroyed the royal supremacy and established Romanism in Ireland, leaving to the Anglicans bare toleration, and to the Presbyterians not even that. Charles behaved after his kind, showing, not only his falseness, but also his total want of real dignity. Ormonde was forced to surrender Dublin to the Parliamentarians (1646), and the inextricable knot awaited Cromwell's sword. The total inability of the Irish Catholics to form anything like a working government during their nine years of power proves that her history, and the discordant ingredients of her population, must ever prevent Ireland from achieving a separate political existence.

Cromwell's campaign (1649–50) showed how easily a good general with an efficient army might conquer Ireland. Resistance in the field was soon at an end; the starving-out policy of Carew and Mountjoy was employed against the guerrillas, and the soldiers were furnished with scythes to cut down the green corn. Bibles were also regularly served out to them. Oliver's severe conduct at Drogheda and elsewhere is not morally defensible, but much may be urged in his favor. Strict discipline was maintained—he hanged soldiers for stealing chickens; faith was always kept; and short, sharp action was more merciful in the long run than a milder but less effective policy. The character and designs of this great man offer a most difficult problem. For a time Lord Clarendon had it all his own way; in due course came a reaction so violent that the Protector has been almost deified in some quarters. Ireton was in many respects a copy of his father-in-law. Cromwell's civil policy, to use Macaulay's words, was "able, straightforward and cruel." He thinned the disaffected population by allowing foreign enlistment, and 40,000 are said to have been thus got rid of. Already Irish Catholics of good family had learned to offer their swords to foreign princes. In Spain, France and the empire they often rose to the distinction which they were denied at home. About 9,000 persons were sent to the West Indies, practically into slavery. Thus, and by the long war, the population was reduced to some 850,000, of whom 150,000 were English and Scots; the marvel is that so many were left. Then came the transplantation beyond the Shannon. The Irish Catholic gentry were removed bodily with their servants and such tenants as consented to follow them, and with what remained of their cattle. They suffered dreadful hardships. To exclude foreign influences, a belt of one mile was reserved to soldiers on the coast from Sligo to the Shannon, but the idea was not fully carried out. The derelict property in the other provinces was divided between adventurers who had advanced money and soldiers who had fought in Ireland. Many of the latter sold their claims to officers or speculators, who were thus enabled to form estates. The majority of Irish laborers stayed to work under the settlers, and the country became peaceful and prosperous. Some fighting Catholics haunted woods and hills under the name of Tories, afterward given in derision to a great party, and were hunted down with as little compunction as the wolves to which they were compared. Measures of great severity were taken against Catholic priests; but it is said that Cromwell had great numbers in his pay, and that they kept him well informed. All classes of Protestants were tolerated, and Jeremy Taylor preached unmolested. Commercial equality being given to Ireland, the woolen trade at once revived, and a shipping interest sprang up. Were it worth while to prove Cromwell a greater statesman than Strafford, his religious and commercial policy in Ireland would supply ample evidence. A legislative union was also effected, and Irish members attended at Westminster.

Charles II. was bound in honor to do something for such Irish Catholics as were innocent of the massacres of 1641, and the claims were not scrutinized too severely. It was found impossible to displace the Cromwellians, but they were shorn of about one-third of their lands. When the Caroline settlement was complete it was found that the great rebellion had resulted in reducing the Catholic share of the fertile parts of Ireland from two-thirds to one-third. Ormonde, whose wife had been allowed by Cromwell's clemency to make him some remittances from the wreck of his estate, was largely and deservedly rewarded. A revenue of £30,000 was settled on the king, in consideration of which Ireland was in 1663 excluded from the benefit of the Navigation Act, and her nascent shipping interest ruined. In 1666 the importation of Irish cattle and horses into England was forbidden, the value of the former at once falling five-fold, of the latter twenty-fold. In 1687 the church of England discovered that there were limits to passive obedience, and at the close of the following year James was a fugitive in France. By this time Londonderry and Enniskillen had closed their gates, and the final struggle had begun. In March, 1689, James reached Ireland with some French troops, and summoned a parliament which repealed the Act of Settlement. The estates of absentees were vested in the crown, and, as only two months law was given, this was nearly equivalent to confiscating the property of all Protestants. Between 2,000 and 3,000 Protestants were attainted by name, and moreover, the act was not published. The dispossessed Protestants escaped by sea or flocked into Ulster, where a gallant stand was made. The glories of Londonderry and Enniskillen will live as long as the English language. The Irish cause produced one great achievement—the defense of Limerick, and one great leader—Patrick Sarsfield. The Catholic Celts, aided by France, were entirely beaten, the Protestant colonists, aided by England, were entirely victorious (battle of the Boyne, July 1, 1690; battle of Aughrim, July 12, 1691). Even the siege of Limerick showed the irreconcilable divisions which had nullified the efforts of 1641. Hugh Baldearg O'Donnell, last of Irish chiefs, sold his services to William for £500 a year. But it was their king that condemned the Irish to hopeless failure. He called them cowards, whereas the cowardice was really his own, and he deserted them in their utmost need. They repaid him with the opprobrious nickname of "Sheemas-a-Cacagh," or Dirty James.

Irish rhetoric commonly styles Limerick "the city of the violated treaty." The articles of capitulation (October 3, 1691) may be read in Leland or Plowden; from the first their interpretation was disputed. Hopes of religious liberty were held out, but were not fulfilled.

Lords Justices Porter and Coningsby promised to do their utmost to obtain a parliamentary ratification, but the Irish parliament would not be persuaded. There was a paragraph in the original draft which would have protected the property of the great majority of Catholics, but this was left out in the articles actually signed. William thought the omission accidental, but this is hardly possible. At all events he ratified the treaty in the sense most favorable to the Catholics, while the Irish parliament adhered to the letter of the document. Perhaps no breach of faith was intended, but the sorrowful fact remains that the modern settlement of Ireland has the appearance of resting on a broken promise. More than 1,000,000 Irish acres were forfeited, and, though some part was returned to Catholic owners, the Catholic interest in the land was further diminished.

From the first the victorious colonists determined to make another 1641 impossible, and the English Government failed to moderate their severity (principal Penal Act, 2 Anne, c. 3). In 1708 Swift declared that the Papists were politically as inconsiderable as the women and children. In despair of effecting anything at home, the young and strong enlisted in foreign armies, and the almost incredible number of 450,000 are said to have emigrated for this purpose between 1691 and 1745. This and the hatred felt toward James II. prevented any rising in 1715 or 1745. The panic-stricken severity of minorities is proverbial, but it is not to be forgotten that the Irish Protestants had been turned out of house and home twice within fifty years. In 1703 the Irish parliament begged hard for a legislative union, but as that would have involved at least partial free trade the English monopolists prevented it. By Poyning's law England had a vote on all Irish legislation, and was therefore an accomplice in the penal laws. No Papist might teach a school or any child but his own, or send children abroad—the burden of proof lying on the accused, and the decision being left to magistrates without a jury. Mixed marriages were forbidden between persons of property, and the children might be forcibly brought up Protestants. A Papist could not be a guardian and all wards in chancery were brought up Protestants. The Protestant eldest son of a landed proprietor might make his father tenant for life and secure his own inheritance. Among Papist children land went in compulsory gavelkind. Papists could not take longer leases than thirty-one years at two-thirds of a rack rent; they were even required to conform within six months of an inheritance accruing, on pain of being ousted by the next Protestant heir. Priests from abroad were banished, and their return declared treason. All priests were required to register and to remain in their own parishes, and informers were to be rewarded at the expense of the Papist inhabitants. No Papist was allowed arms, two justices being empowered to search; and if he had a good horse any Protestant might claim it on tendering £5. These laws were of course systematically evaded. The property of Roman Catholics was often preserved through Protestant trustees, and it is understood that faith was generally kept.

The restraints placed by English commercial jealousy on Irish trade destroyed manufacturing industry in the south and west. Driven by the Caroline legislation against cattle into breeding sheep, Irish graziers produced the best wool in Europe. Forbidden to export it, or to work it up profitably at home, they took to smuggling, for which the indented coast gave great facilities. The enormous profits of the contraband trade with France enabled Ireland to purchase English goods to an extent greater than her whole lawful traffic. The moral effect was disastrous. The religious penal code it was thought meritorious to evade; the commercial penal code was ostentatiously defied; and both tended to make Ireland the least law-abiding country in Europe.

When William III. proceeded to depress the Irish woolen trade, he promised to do all he could for Irish linen. England did not fulfill the second promise; still the Ulster weavers were not crushed, and their industry flourished. Some Huguenot refugees, headed by Louis Crommelin, were established by William III. at Lisburn, and founded the manufacturing prosperity of Ulster. Other Huguenots attempted other industries, but commercial restraints brought them to nought. The peculiar character of the flax business has prevented it from crossing the mountains which bound the northern province. Wool was the natural staple of the south.

The Scottish Presbyterians who defended Londonderry were treated little better than the Irish Catholics who besieged it—the sacramental test of 1704 being the work of the English council rather than of the Irish parliament. In 1715 the Irish House of Commons resolved that anyone who should prosecute a Presbyterian for accepting a commission in the army without taking the test was an enemy to the king and to the Protestant interest. Acts of indemnity were regularly passed throughout the reign of George II., and until 1780, when the Test Act was repealed. A bare toleration had been granted in 1720. Various abuses, especially forced labor on roads which were often private jobs, caused the Oakboy insurrection in 1764. Eight years later the Steelboys rose against the exactions of absentee landlords, who often turned out Protestant yeomen to get a higher rent from Roman Catholic cotters. The dispossessed men carried to America an undying hatred of England which had much to say in the American revolution, and that again reacted on Ireland. Lawless Protestant associations, called Peep o' Day Boys, terrorized the north and were the progenitors of the Orangemen (1789). Out of the rival "defenders" Ribbonism in part sprung. The United Irishmen drew from both sources (1791).

But the Ulster peasants were never as badly off as those of the south and west. Writers the most unlike each other—Swift and Boulter, Berkeley and Stone, Arthur Young and Dr. Thomas Campbell—all tell the same tale. Toward the end of the seventeenth century Raleigh's fatal gift had already become the food of the people. When Chief Baron Rice went to London in 1688 to urge the Catholic claims on James II., the hostile populace escorted him in mock state with potatoes stuck on poles. Had manufactures been given fair play in Ireland, population might have preserved some relation to capital. As it was, land became almost the only property, and the necessity of producing wool for smuggling kept the country in grass. The poor squatted where they could, receiving starvation wages, and paying exorbitant rents for their cabins, partly with their own labor. Unable to rise, the wretched people multiplied on their potato plots with perfect recklessness. During the famine which began in the winter of 1739 one-fifth of the population is supposed to have perished; yet it is hardly noticed in literature, and seems not to have touched the conscience of that English public which in 1755 subscribed £100,000 for the sufferers by the Lisbon earthquake. As might be expected where men were allowed to smuggle and forbidden to work, redress was sought in illegal combinations and secret societies. The dreaded name of Whiteboy was first heard in 1761, and agrarian crime has never since been long absent. Since the Union we have had the Threshers, the Terry Alts, the Molly Maguires, the Rockites, and many others. Poverty has been the real cause of all these disturbances, which were often aggravated by the existence of factions profoundly indicative of barbarism. Communism, cupidity, scoundrelism of all kinds have contributed to every disturbance. The tendency shown to screen the worst criminals is sometimes the result of sympathy, but more often of fear. The cruelties which have generally accompanied Whiteboyism is common to servile insurrections all over the world. No wonder if Irish landlords were formerly tyrannical, for they were in the position of slave-owners. The steady application of modern principles, by extending legal protection to all, has altered the slavish character of the oppressed Irish. The cruelty has not quite died out, but it is much rarer than formerly; and generally speaking, the worst agrarianism has of late years been seen in the districts which retain most of the old features.

The volunteers extorted partial free trade (1779), but manufacturing traditions had perished, and common experience shows how hard these are to recover. The demand for union was succeeded by a craving for independence. Poyning's law was repealed, and in 1782, in Mr. Grattan's opinion, Ireland was at last a nation. The ensuing period of eighteen years is the best known in Irish history. The quarrel and reconciliation of Flood and Grattan, the kindly patriotism of Charlemont, the eloquence, the devotion, the corruption, are household words. In 1784 out of 300 members eighty-two formed the regular opposition, of whom thirty were the nominees of Whig potentates and fifty-two were really elected. The majority contained twenty-nine members considered independent, forty-four who expected to be bought, forty-four placemen, twelve sitting for regular government boroughs, and twelve who were supposed to support the government on public grounds. The remaining seats were proprietary, and were let to government for valuable consideration. The House of Lords, composed largely of boroughmongers and controlled by political bishops, was even less independent. Only Protestant freeholders had votes, which encouraged leases for lives, about the worst kind of tenure, and the object of each proprietor was to control as many votes as possible. The necessity of finding Protestants checked subdivision for a time, but in 1793 the Roman Catholics received the franchise, and it became usual to make leases in common, so that each lessee should have a freehold interest of forty shillings. The landlord indeed had little choice, for his importance depended on the poll-book. Salaries, sinecures, even commissions in the army were reserved for those who contributed to the return of some local magnate.

But no political cause swelled the population as much as the potato. Introduced by Raleigh in 1610, the cultivation of this dangerous tuber developed with extraordinary rapidity. The Elizabethan wars were most injurious to industry, for men will not sow unless they hope to reap, and the very essence of military policy had been to deprive a recalcitrant people of the means of living. The Mantuan peasant was grieved at the notion of his harvest being gathered by barbarian soldiers, and the Irishman could not be better pleased to see his destroyed. There was no security for anyone, and everyone was tempted to live from hand to mouth. The decade of anarchy which followed 1641 stimulated this tendency fearfully. The labor of one man could plant potatoes enough to feed forty, and they could neither be destroyed nor carried away easily. When Petty wrote, early in Charles II.'s reign, this demoralizing esculent was already the national food. Potatoes cannot be kept very long, but there was no attempt to keep them at all; they were left in the ground, and dug as required. A frost which penetrated deep caused the famine of 1739. Even with the modern system of storing in pits the potato does not last through the summer, and the "meal months"—June, July and August—always brought great hardship. The danger increased as the growing population pressed ever harder upon the available land. Between 1831 and 1842 there were six seasons of dearth, approaching in some places to famine.

The population increased from 2,845,932 in 1785 to 5,356,594 in 1803. They married and were given in marriage. Wise men foresaw the deluge, but people who were already half-starved every summer did not think their case could well be worse. In 1845 the population had swelled to 8,295,061, the greater part of whom depended on the potato only. There was no margin, and when the "precarious exotic" failed an awful famine was the result.

Great public and private efforts were made to meet the case, and relief works were undertaken, on which, in March, 1847, 734,000 persons, representing a family aggregate of not less than 3,000,000, were employed. It was found that labor and exposure were not good for half-starved men. The jobbing was frightful, and is probably inseparable from wholesale operations of this kind. The policy of the government was accordingly changed, and the task of feeding a whole people was undertaken. More than 3,000,000 rations, generally cooked, were at one time distributed, but no exertions could altogether avert death in a country where the usual machinery for carrying, distributing, and preparing food was almost entirely wanting. From 200,000 to 300,000 perished of starvation or of fever caused by insufficient food. An exodus followed which, necessary as it was, caused dreadful hardship, and among the Catholic Irish in America Fenianism took its rise.

Great brutalities disgraced the rebellion of 1798, but the people had suffered much and had French examples before them. The real originator of the movement was Theobald Wolfe Tone, whose proffered services were rejected by Pitt, and who founded the United Irishmen. His Parisian adventures, detailed by himself, are most interesting, and his tomb is still the object of an annual pilgrimage. Tone was a Protestant, but he had imbibed socialist ideas, and hated the priests, whose influence counteracted his own. In Wexford, where the insurrection went farthest, the ablest leaders were priests, but they acted against the policy of their church.

The inevitable Union followed (January 1, 1801). Pitt had long before (1785) offered a commercial partnership which had been rejected on the ground that it involved the ultimate right of England to tax Ireland. He was not less liberally inclined in religious matters, but George III. stood in the way, and like William III. the minister would not risk his imperial designs. Carried in great measure by the same corrupt means as the constitution of '82 had been worked by, the Union earned no gratitude. But it was a political necessity, and Grattan never gave his countrymen worse advice than when he urged them to "keep knocking at the Union." The advice has, however, been taken. Emmet's insurrection (1803) was the first emphatic protest. Then came the struggle for emancipation. It was proposed to couple the boon with a veto on the appointment of Roman Catholic bishops. It was the ghost of the old question of investitures. The remnant of the Catholic aristocracy would have granted it; even Pius VII. was not invincibly opposed to it; but Daniel O'Connell took the lead against it. Under his guidance the Catholic association became a formidable body. At last the priests gained control of the elections; the victor of Waterloo was obliged to confess that the king's government could no longer be carried on, and Catholic emancipation had to be granted (1829). The tithe war followed, and this most oppressive of all taxes was unfortunately commuted (1838) only in deference to clamor and violence. The repeal agitation was unsuccessful, but let us not be extreme to mark the faults of O'Connell's later years. He doubtless believed in repeal at first; probably he ceased to believe in it, but he was already deeply committed, and had abandoned a lucrative profession for politics. With some help from Father Mathew he kept the monster meetings in order, and his constant denunciations of lawless violence distinguish him from his imitators. His trial took place in 1844. There is a sympathetic sketch of O'Connell's career in Lecky's *Leaders of Opinion;* Wyse's *History of the Catholic Association* gives the best account of the religious struggle, and much may be learned from Fitzpatrick's *Life of Bishop Doyle.*

The national system of education introduced in 1833 was the real recantation of intolerant opinions, but the economic state of Ireland was fearful. The famine, emigration, and the new poor law have nearly got rid of starvation, but the people have not become frankly loyal, for they feel that they owe more to their own importunity, to their own misfortunes, than to the wisdom of their rulers. The literary efforts of Young Ireland eventuated in another rebellion (1848); a revolutionary wave could not roll over Europe without touching the unlucky island. After the failure of that wretched outbreak there was peace until the close of the American war released a number of adventurers trained to the use of arms and filled with hatred to England.

Already in 1858 the discovery of the Phœnix conspiracy had shown that the policy of Mitchel and his associates was not forgotten. John O'Mahony, one of the men of '48, organized a formidable secret society in America, which his historical studies led him to call the Fenian brotherhood. The money raised in the United States was perhaps not less than £80,000 ($400,000), but it is due to O'Mahony to say that he died poor. In Ireland the chief direction of the conspiracy was assumed by James Stephens, who had been implicated in the Phœnix affair, and who never cordially agreed with O'Mahony. Stephens was very despotic—a true revolutionary leader. As in all Irish political conspiracies, there were traitors in the camp, who kept the authorities well informed, and in September, 1865, the *Irish People* newspaper, which had been the organ of the movement, was suddenly suppressed by the government. The arrests of Luby, O'Leary, and O'Donovan Rossa followed, all of whom, with many others, were afterward prosecuted to conviction. Stephens for a time eluded the police, living with little concealment in a villa near Dublin, and apparently occupied in gardening. But in November he was identified and captured, much evidence being found in his house. Ten days afterward he escaped from Richmond prison, and it is now known that some of the warders were Fenians. Another conspirator, sometimes called O'Brien and sometimes Osborne, afterward escaped from Clonmel jail. American papers stated that Stephens was in actual want in New York in the winter of 1880, but he has since been heard of at Paris. The promptitude of the government perhaps prevented a general insurrection, but there was a partial outbreak in February and March, 1867, chiefly in Kerry, Limerick, and Tipperary. There was an affray, if it deserves the name, at Tallaght near Dublin, and a plot to seize Chester Castle was discovered and frustrated. The police, who behaved extremely well, were often attacked, but the Fenians abstained from plunder or from any acts which might estrange the rural population. The peasants, however, though for the most part nationalists, did not care to risk their lives in such a wild enterprise, and the young men of the towns furnished the only real force. Weather of extraordinary severity, which will long be remembered as the "Fenian winter," completed their discomfiture, and they suffered fearful hardships. There was enough sympathy with the movement to procure the election of O'Donovan Rossa for Tipperary in 1867, when he was actually undergoing penal servitude. John Mitchel, whose old sentence was unreversed, was chosen by the same constituency as late as 1875, but in neither case was the vote a large one. It became the fashion in Ireland to celebrate annually the obsequies of the "Manchester martyrs," as the three Fenians were called who suffered death for the murder of Police-sergeant Brett. The Roman Catholic Church has always opposed secret societies, and some priests had the firmness to discountenance these political funerals, but strong popular excitement in Ireland has generally been beyond clerical control.

The Fenian movement disclosed much discontent, and was attended by criminal outrages in England. The abolition of the Irish Church Establishment, which had long been condemned by public opinion, was then decreed (1869). The land question was next taken in hand (1870). Then followed the rise of the Home Rule party, at first under the leadership of Dr. Isaac Butt, afterward to pass into the stronger hand of Charles Stewart Parnell. In 1874 the policy of obstruction was fully inaugurated at Westminster. Bad seasons and agrarian distress added force to the Land League. The British Government continued its policy of compromise legislation accompanied by coërcion bills. Under the latter, law became the will of the Chief Secretary, and the leaders of the Irish cause in parliament were jailed without warrant and held without trial. The Tory House of Lords by the rejection of the "Compensation for Disturbance" bill again recorded itself on the wrong side. The well-meant efforts of Mr. Gladstone to ameliorate the condition of Ireland were blocked by the bigoted Tories and the hide-bound bourgeois, and by a combination with the so-called Liberal Unionists remedial legislation was again postponed. Under the Salisbury government a bill was offered containing a panacea for the troubles of Ireland, but this being looked upon with the suspicion naturally attaching to a gift from such a source, nothing came of it.

IRELAND, Samuel, the dupe of his son, the subject of the following article, in the publication of the supposed Shakespearean papers, was born in London, where he was originally a mechanic at Spitalfields. He afterward became a dealer in old books and prints and similar articles; and, turning his knowledge of drawing and engraving to account, he published several books of travel, with illustrations in aquatint. On December 24, 1796, Ireland published the *Miscellaneous Papers and Legal Instruments under the Hand and Seal of William Shakspeare; including the Tragedy of King Lear and a small fragment of Hamlet*, dated 1797, and purporting to be copies of originals furnished him by his son. Although, on the exposure of the fraud, the latter asserted his father's complete innocence, Samuel Ireland felt the disgrace very bitterly, and the occurrence is said to have hastened his death, which took place in July, 1800.

IRELAND, Samuel William Henry, generally known as William Henry Ireland, who at the age of seventeen produced the notorious Shakespeare forgeries, was the son of the subject of the last notice, and was born in London in 1777. After spending four years at school in France, he was apprenticed in 1794 to a conveyancer in London. The enthusiasm of his father for everything connected with Shakespeare suggested to young Ireland the idea of delighting him with a forged autograph of the poet. He carefully drew up a copy of an old deed, purporting to be a lease from Shakespeare to certain other parties, and presented it as a genuine document to his unsuspecting father. The complete success of this first attempt and the eager solicitations of his friends to ransack the papers among which he pretended to have found the lease were the incitements to a more ambitious career of literary forgery. He invented a story of a gentleman, accidentally met with, among whose old papers the documents were found, but who, for various reasons, refused to permit his name to be disclosed. A large collection of the most interesting relics was brought to light. A profession of faith, a love-letter, inclosing a lock of the poet's hair, to Anne Hathaway, private letters to and from Shakespeare, theatrical memoranda, notes of hand and receipts, agreements between Shakespeare and actors, pictures, annotated books and tracts—all were produced and received with delighted credulity. Doctor Parr, Doctor Wharton, Sir Isaac Heard, James Boswell, and others came to register their belief in the authenticity of the papers. The assurance with which the imposture was conducted may be judged from the fact that a deed was brought forward, in which it was set forth that the papers and books had been bequeathed by Shakespeare to a certain contemporary William-Henrye Irelaunde, who had rescued him from drowning in the Thames, and who, there was evidence to show, was the direct ancestor of the Ireland whom chance had thrown in the way of the possessor of the relics. At last a whole new play, named *Vortigern*, was announced as having been discovered. Sheridan purchased it for Drury Lane Theater, and an overflowing house assembled to sit in judgment upon it. But away from the glamour of crabbed handwriting and yellow paper, the feeble dialogue and crude conceptions of the tragedy could not stand the test, and one representation sufficed to prove it a complete failure. Its fate prevented the composition of a series of historical plays, of which *Henry II.* had already been produced by the impudent Ireland. Samuel Ireland the elder had published the miscellaneous papers in what he asserts to have been the fullest belief in their authenticity, but the hostile criticism of Malone and others, and the unsatisfactory account of the source of the papers, combined to compel him to demand a full disclosure from his son. Harassed by the success of his own deceit, which had carried him far beyond his first intention, Ireland at last confessed his fraud, and published a tract with a full account in 1796. In 1805 he published more elaborate *Confessions*, in which he cannot conceal his satisfied vanity. After the exposure, Ireland was forced to abandon both his home and his profession. He wrote several novels of no value, and gradually sank to the condition of a bookseller's hack. He died in great penury in April, 1835.

IRENÆUS, bishop of Lyons in the end of the second century, was one of the most distinguished of the theologians of the ante-Nicene church. Very little is known of his early history, and the accounts given in various biographies are for the most part conjectural. He himself has informed us that in his youth he was acquainted with Polycarp, the disciple of John, and from this fact, together with his Greek name, his early and thorough Christian training, and his great acquaintance with Greek literature, it has been conjectured that he belonged to the neighborhood of Smyrna in Asia Minor, and that he was the child of Christian parents. It is most probable that he died in the year 202, but the date of his birth is quite uncertain; the best authorities place it between 120 and 140. How he, born and educated in Asia Minor, came to spend his life in Gaul is also unknown. Eusebius tells us that he was a presbyter of Pothinus, bishop of Lyons, and it has been inferred from that passage that he was ordained by that bishop. Irenæus was best known by his endeavors to counteract the teachings of the Gnostics, and his attempts to mediate between the bishops of Rome and the churches of Asia Minor in their disputes about the proper time at which to keep Easter. Gregory of Tours is our authority for saying that Irenæus died a martyr in the persecution under Severus; but, as this fact is not mentioned by Tertullian, Augustine, Eusebius, Theodoret, and other early writers, it is considered doubtful by most modern scholars. His death, whether crowned with the honor of martyrdom or not, must have taken place near the beginning of the third century. Gregory tells us that the bones of Irenæus were buried under the altar of the church at Lyons. The story that they were dug up and thrown into the street by the Calvinists in 1562 has been abundantly refuted.

IRENE (752–803) was the wife of Leo IV., emperor of the East. A poor but beautiful Athenian orphan, she speedily added the confidence to the love of her feeble husband, and at his death in 780 was left by him sole guardian of the empire, and of their young son Constantine VI. Seizing the supreme power in the name of the latter, Irene's first endeavors were to revive the orthodox image-worship, which she had secretly cherished, although compelled solemnly to abjure it in the lifetime of her iconoclastic father-in-law and husband. In 1784 she obtained the elevation of Tarasius, a partisan of her own, to the patriarchate; and, at first suffering the laws against image-worshipers to fall into disuse, she assembled a council of clergy at Nicæa in 787 to discuss the whole question anew. Under the auspices of a ruler whose wishes were so clearly known, the decision of this second council of Nice could take only one direction, and the Iconoclasts were hurled from their supremacy. So long as Constantine remained a child, Irene was able to combine his interests and her own, and to rule wisely and faithfully; but as the prince approached maturity he began to grow restive under her autocratic sway. The discontent which this occasioned swelled in 790 into open resistance, and the soldiers, headed by the Armenian guard, formally proclaimed Constantine VI. as the sole ruler. A hollow semblance of friendship was maintained between Constantine and Irene, whose title of empress he confirmed in 792; but the court, the army, and the capital were divided between rival factions, and that which supported the mother against her son grew daily in number and strength. Constantine perceived his danger too late to avert it; and when he saw the conspiracy ripe for action he could only flee for aid to the provinces. But even there he was surrounded by those who were already too deeply implicated in treason to refuse to complete their perfidy. Seized by his attendants on the Asiatic shore of the Bosporus, the emperor was carried a captive back to the palace at Constantinople; and there, by the orders of his inhuman mother, in the very porphyry chamber where he first saw the light, his eyes were stabbed out by fierce blows of a murderous dagger. In 802 the patricians, upon whom she had lavished every honor and favor, conspired against her, and placed the avaricious Nicephorus on the throne. The haughty and unscrupulous princess, "who never lost sight of political power in the height of her religious zeal," who, hailed by the church as a second Helena, the mother of another great Constantine, had revealed herself to the world as a second Athaliah, was forced in her exile in Lesbos to support herself by the daily toil of her distaff. She died the following year. Her religious zeal has given her a place among the saints of the Greek Church.

IRETON, Henry, Parliamentary general, was the eldest son of German Ireton of Attenton in Nottinghamshire, and was born in 1610. After graduating B.A. at Oxford, he entered the Middle Temple, London, as a student of law; but on the outbreak of the civil war he joined the Parliamentary army, in which his technical mastery of the military art gave him rapid promotion and helped him to obtain the special favor of Cromwell. On the formation of the "new model" he was appointed captain in Sir Robert Pye's regiment. Shortly before the battle of Naseby, in June, 1645, he was promoted to a colonelcy, and on the eve of the battle he was on the suggestion of Cromwell made commissary-general and appointed to the command of the left wing, Cromwell himself commanding the right. The wing under Ireton was completely broken by the impetuous charge of Rupert, and Ireton was taken prisoner, but after the rout of the enemy which ensued on the successful charge of Cromwell he regained his freedom. He was present at the siege of Bristol in the September following, and he took an active part in the subsequent victorious campaign which resulted in the overthrow of the royal cause. While occupied with the siege of Oxford he was, in June 15, 1646, married at Holton House, five miles distant from the city—and at that time probably the headquarters of Fairfax—to Bridget, daughter of Oliver Cromwell. In the negotiations of the army with the Parliament, and in the conferences with the king, he took a leading part, being the person chiefly intrusted with the drawing up of the army papers, including the heads of proposals from the army to the king. He is said to have been one of the principal instigators of the trial of the king, and was one of the most zealous advocates of his execution. The regiment of Ireton having been chosen by lot to accompany Cromwell in his Irish campaign, Ireton was appointed major-general; and on the recall of his chief to take the command in Scotland he remained with the title and powers of lord-deputy to complete the work of reduction. This he proceeded to do with his usual energy, and as much by the severity of his methods of punishment as by his military skill was rapidly bringing his task to a close, when during the siege of Limerick he died, November 26, 1651, of an inflammatory fever, the result, in all probability, of exhaustion and exposure.

IRIARTE, or Yriarte, Tomas de, Spanish poet of the age of Charles III. was born on the Isle of Teneriffe in 1750 and died in 1791.

IRIDIUM, one of the metals of the platinum group, has recently acquired increased importance from its employment in alloy with platinum in the construction of the international standards of length and weight. Its separation from the associated metals is a matter of very considerable difficulty, and involves a long series of operations. In practice, even when prepared with the utmost care, it still contains a minute though almost inappreciable amount of oxygen, rhodium, ruthenium, and possibly iron.

IRIS, the rainbow, was personified as one of the secondary deities of Olympus, and occurs very frequently both in art and in literature. As the rainbow unites earth and heaven, Iris is the messenger of the gods to men; in this capacity she is mentioned frequently in the *Iliad*, but never in the *Odyssey*, where Hermes takes her place. According to Hesiod she is the daughter of Thaumas and Electra and sister of the Harpies, the stormwinds.

IRIS. The iris flower belongs to the natural family *Iridaceæ*, of the class monocotyledons, and to the petaloid division with inferior ovary and only three stamens (the outer series), being thus distinguished from the *Amaryllis* family, which has six stamens. They are handsome showy-flowered plants, the Greek name iris having been applied on account of the hues of the flowers. Two of the species are British—*I. Pseudacorus*, or yellow flag, and the *I. fœtidissima*, the fetid iris or roast-beef plant, with blue-purple rarely yellow flowers. The former species is widely distributed; the latter is English, although naturalized in Scotland and Ireland. The roasted seeds of *I. Pseudacorus* have been used as a substitute for coffee. *Iris florentina*, with white or pale blue flowers, is a native of the south of Europe, and is the source of the violet-scented orris root used in perfumery. *Iris versicolor*, or blue flag, is indigenous to North America, and yields "iridin," a powerful hepatic stimulant.

IRISH MOSS, or Carrageen, is a seaweed which grows abundantly along the rocky parts of the Atlantic coast of Europe and North America. It is collected for commercial purposes on the west and northwest of Ireland, and in very large quantities on the coast of Plymouth county, Massachusetts. In its fresh condition the plant is soft and cartilaginous, varying in color from a greenish-yellow to a dark purple or purplish-brown; but when washed and sun-dried for preservation it has a yellowish, translucent, horn-like aspect and consistency. The principal constituent of Irish moss is a mucilaginous body, of which it contains about 55 per cent.; and with that it has nearly 10 per cent. of albuminoids and about 15 per cent. of mineral matter rich in iodine and sulphur. When softened in water it has a sea-like odor, and from the abundance of its mucilage it will form a jelly on boiling with from twenty to thirty times its weight of water. The jelly of Irish moss is used as an occasional article of food, and is a popular remedy in cases of chest disease. It may also be used as a thickener in calico-printing, and in America it is used for fining beer. In the neighborhood where it is obtained it is utilized for feeding cattle.

IRISH SEA, a body of water lying between the north of Ireland and the north of England, with the southwestern counties of Scotland on the north. It is connected with the Atlantic on the northwest by the North Channel and on the south by St. George's Channel. Between the coasts of Louth (Ireland) and Lancaster the Irish Sea has a width of 150 miles; its greatest length north and south is about the same. Within its boundaries lie the Isle of Man and Anglesey, with Holyhead Island.

IRKUTSK, a government of Asiatic Russia, extending over an area of 272,140 square miles of eastern Siberia, and bounded by the Yenissei and Yakutsk governments, the Trans-Baikal region, and the Chinese frontier. It is divided into the districts of Kirensk, Nizhne-Udinsk, Irkutsk, Verkholensk, and Balagansk.

Irkutsk, the chief town of the government of the same name, is under various aspects the most important place in all Siberia, being not only the greatest center of population and principal commercial depot to the north of Tashkend, but the residence of the governor-general, a fortified military post, an archbishopric, and the seat of several learned societies. It is 3,780 miles from St. Petersburg. The town proper lies on the right bank of the Angara, a tributary of the Yenissei, and on the opposite bank is the Glaskovsk suburb. The river, which has a breadth of 1,890 feet, is crossed by a flying bridge. Irkutsk has long been reputed a remarkably fine city for such an outlying situation—its streets being straight, broad, well paved, and well lighted; but in 1879, on June 22d and 24th (July 4th and 6th), the greater proportion of its houses being of wood, the central and most important part fell a prey to a great conflagration. The palace of the governor-general, the principal administrative and municipal offices, and many of the other public buildings were destroyed; and the government archives, the admirable library (10,000 vols.) and museum of the Siberian section of the Geographical Society, with minor collections of the same kind, were utterly ruined. The total loss was estimated at 30,000,000 rubles. A cathedral (built of wood in 1693 and rebuilt of stone in 1718) and twenty-three other Orthodox churches, a fine gymnasium, a school of medicine, a museum, a theater, a town hospital and a military hospital, an orphan asylum, an infirmary, the penitentiary, and the crown factories are among the public institutions and buildings. Population (1898), 51,434.

IRNERIUS, a distinguished jurist, sometimes referred to as "lucerna juris," who taught the "free arts" at Bologna, his native city, during the earlier decades of the twelfth century. Of his personal history nothing is known. except that it was at the instance of the Countess Matilda, Hildebrand's friend, who died in 1115, that he directed his attention and that of his students to the *Institutes* and *Code* of Justinian; that after 1116 he appears to have held some office under the emperor Henry V.; and that he died, perhaps during the reign of the emperor Lothair II., but certainly before 1140. He was the first of the Glossators (see GLOSS), and according to ancient opinion (which, however, has been much controverted in later times) was the author of the epitome of the *Novelis* of Justinian, called the *Authentica*, arranged according to the titles of the *Code*.

IRON. The peculiar physical characters of iron, more especially when in the form of steel or slightly carbonized iron, have rendered this element one of special importance since the earliest ages for the fabrication of cutting instruments, weapons, and tools of various kinds. In the form of moderately pure malleable or wrought iron, the metal is a substance possessed of considerable luster and hardness, and of a bluish-white or bluish-gray color; it takes a high polish, and when bright does not readily oxidize in dry air, although moist air, especially in presence of traces of acids, even of carbonic acid, readily effects its tarnishing and the subsequent formation of rust. It has a specific gravity near to 7.75, and requires a very high temperature to effect its fusion, the melting point being the more elevated the purer the substance; its most valuable and characteristic property is its power of becoming soft and pasty before undergoing complete fusion, so that two hot masses may be pressed or squeezed together into one by the process of *welding*, and so that by forging, rolling, hammering or other analogous operations it can readily be fashioned into shapes which its rigidity and strength when cold enable it to maintain. Its strength and tenacity are very high, as also are its powers of being drawn into wire and rolled or hammered into sheets (ductility and malleability); these properties, however, are very largely influenced by the presence of impurities. In magnetic character it is superior to all other substances, nickel and cobalt coming next to it in these respects, but being much lower in power; when it is almost pure, the magnetic influence produced, owing to induction, by the proximity of a permanent magnet or of an electric current disappears entirely on removal of the magnet or current; if, on the other hand, carbon be present (as is usually the case to some extent even in the softest malleable iron), there remains after removal of the magnet or current a greater or less amount of permanent magnetism according to circumstances, hard steel exhibiting the greatest power of becoming permanently magnetized under given conditions, and substances intermediate between pure iron and hard steel (soft steels and hard irons) possessing this power to a lesser extent. Other elements besides carbon, *e.g.*, oxygen and sulphur, can communicate to iron the power of becoming permanently magnetized, as in the case of mineral loadstone (magnetic oxide of iron) and magnetic pyrites. The effect of a magnet on iron at high temperatures is far below that exhibited at ordinary temperatures. In electrical conductivity and power of conducting heat (which are always approximately in the same ratio), iron stands about midway among metals.

Pouillet gives the melting point when in a state of high purity as between 1,500° and 1,600° (probably somewhat too low), Scheerer as 2,100°, Deville as near to that of platinum, which is not far from 1,900°–2,000°. The presence of minute quantities of carbon, sulphur, etc., sensibly lowers the fusing point, while 1 per cent. of the former furnishes a steel melting at several hundred degrees lower than pure iron (at near 1,600°)—cast iron containing some 3 per cent. of carbon melting at near 1,500°, and being rendered still more fusible by the presence of small quantities of sulphur and silicon; whence sulphurized pig irons are often blended with purer varieties in order to produce good casting metal for various purposes. At the ordinary temperature the linear coëfficient of expansion of wrought iron is near to 0.0000125 (values between 0.0000115 and 0.0000144 having been obtained by Borda, Smeaton, Lavoisier and Laplace, Troughton, and Dulong and Petit), so that one unit of length at 0° will become on an average 1.00125 units in length at 100°. Slightly lower values have been obtained with steel of different qualities by various of these observers, averaging 0.0000115; while cast iron expands less still, averaging 0.0000111 as linear coëfficient of expansion; the precise numbers obtainable vary with the conditions, according as the metal has been hammered, rolled, hardened, annealed, etc. At somewhat elevated temperatures the rate of expansion is higher; thus Dulong and Petit find that the mean rate of expansion of iron between 0° and 100° is to that between 0° and 300° nearly in the ratio of four to five. The force exerted during expansion is very great, being equal to that requisite to produce an elongation of the bar examined to the extent through which its length increases by heat; thus, according to Barlow, a weight of one ton suspended to an iron bar a square inch in section will extend its length by 0.0001 times the original length, so that one inch of length will become 1.0001 inches; this increase in length would be brought about by a rise in temperature of about 9° C.; hence for an increase of 36°, or less than the average difference between a cold and warm day in winter and summer respectively, a girder of iron of twenty square inches in section would exert a thrusting strain upon two walls, etc., built firmly up to its ends when coldest, equal to about $20\times\frac{36}{9}$ or 80 tons for each inch of its length, were it not that the pressure is more or less relieved by the giving of the walls long before this strain is reached. In consequence it is indispensable to allow a space for expansion in all constructions in which iron is employed, *e.g.*, ordinary buildings, railways, furnaces braced together with tie-rods, etc.

With large masses of ironwork exposed to the weather, very great strains may be produced through unequal expansion in differently heated parts, *e.g.*, in the portions exposed to sunshine and in the shade respectively; as just indicated, a difference of temperature of 9° between two portions rigidly connected will produce a strain of about one ton per square inch. Edwin Clark has calculated that half an hour's sunshine produces more effect in the way of developing strain on the tubes of the Britannia bridge over the Menai Straits than the heaviest rolling loads or the most viofen storms. Variations of temperature also exert some effect upon the strength and tenacity of iron; the numerical values are largely variable with the quality of the metal. At temperatures below a red heat the strength is considerably lessened, and at high temperatures approximating to the welding temperature the tenacity becomes comparatively small. Iron unites with oxygen in several proportions, forming definite oxides. The *sulphides* of iron partly correspond to the oxides. The *chlorides* of iron correspond to the ferrous and ferric series of salts.

Iron possesses the power of uniting with a number of elements, forming products which either are highly intimate mixtures of more than one substance presenting apparent homogeneity, or else are compounds of an indefinite character, *i.e.*, in which the constituents are combined in proportions which do not come under the usual chemical laws of invariableness of composition and of combination in multiple proportions; in short, these iron compounds are substances belonging to the same category as alloys generally and solutions, the placing of which inside or outside the class of true chemical compounds depends on the particular definition of a chemical compound adopted. Probably the most accurate view of the constitution of such substances is that which regards them as being "solidified solutions" of one substance in another (Matthiessen), *i.e.*, when the bodies in question have been fused; the most useful commercial forms of iron are of this class. Thus, for example, iron sulphide and metallic iron fused together in such proportions that the latter greatly predominates form a homogeneous mixture (or solution of iron sulphide in molten iron), which on cooling solidifies as a whole, not exhibiting any tendency to separation of the iron and iron sulphide; a product similar but melting more readily is formed if iron sulphide and sulphur be fused together, forming one of the varieties of the so-called "Spence's metal" recently patented; so that between the extremes of pure iron on the one hand and pure sulphur on the other an apparently homogeneous mass can be obtained containing iron or sulphur in any assignable proportions, the compound being a solidified solution of iron sulphide in either iron or sulphur, according as the former or the latter is in excess. Silicon and phosphorus can be similarly incorporated with excess of iron, forming analogous solidified solutions; the same remark is true for nitrogen and other non-metallic elements, as well as for manganese and many other metals, notably nickel, gold, tin, platinum, rhodium, aluminium, zinc, titanium, tungsten, and chromium. When carbon is incorporated with iron a peculiar phenomenon is (under certain circumstances) observable which has no parallel with the other compounds, except perhaps to some extent in the case of silicon; this is that, whereas the carbon is in the amorphous condition when first dissolved, yet on long-continued maintenance in the molten state, but more especially on cooling (while the substance is still liquid or semisolid), a more or less complete separation of carbon *in the crystallized graphitoidal state* often ensues; so that the cooled mass is no longer visibly homogeneous, but consists of granules and crystals, partly of graphite and partly of solidified solution of amorphous carbon (and such other elements as were originally present) in iron. This phenomenon may be compared with a somewhat analogous change undergone by phosphorus; when this element is dissolved in carbon disulphide or certain organic bodies, *e.g.*, ethyl iodide, the phosphorus gradually changes more or less completely into the red variety, which, being insoluble in the menstruum, precipitates in flakes. The amount of carbon which changes during solidification from the amorphous into the graphitoidal variety depends largely on the nature and amount of the substances present along with it dissolved in the iron, and also on the absolute amount of carbon present and on the rate of cooling; it appears to be promoted by the presence of silicon, the grayest irons being usually the richest in silicon. On remelting graphitoidal cast iron, the graphite is again dissolved, so that by rapidly chilling the fused mass "white" iron results. Under certain conditions silicon appears to extrue from highly silicious irons in cooling, but not in a difficultly oxidizable form, so that the outside of the pigs becomes covered with silica of a peculiar physical aspect; under other conditions several parts per cent. of silicon can be permanently retained by the pig without extrusion on cooling, forming a peculiar metal known as "glazy iron," bearing to the silicious pig from which silicon does separate much the same relations as highly carbonized white iron bears to gray pig.

When foreign substances are present in but small quantity (manganese excepted), and the amount of total carbon does not exceed 1.5 to 2.0 per cent. of the iron, little or no separation of graphitoidal carbon takes place, and the resultant product is tolerably homogeneous, and possesses the properties of *steel* more or less soft in proportion as the carbon percentage is minute or otherwise.

When the carbon amounts to some 2.5 or upward per cent. of the iron, and especially when the fused substance is rapidly cooled, the metal often solidifies as an almost homogeneous mass, possessing somewhat different properties from those of good steel; it is then known as *white cast iron* (from its color after fracture); under other conditions, especially when a longer time is allowed for solidification, a more or less complete separation of graphite and consequent production of a coarse-grained crystalline structure results, the product being then termed *gray cast iron*, which consequently stands to white cast iron in much the same relation as devitrified glass (Réaumur's porcelain) to ordinary glass. When the amount of manganese present is relatively large (constituting several parts per cent. of the iron present), this separation of graphitoidal carbon takes place to but a small or even inappreciable extent; the cooled mass is homogeneous and highly crystalline, the fractured surface exhibiting great brilliancy, whence the term *spiegeleisen* applied to such substances. As a rule cast irons, whether white or gray, contain more than traces of impurities, such as sulphur, phosphorus, and silicon; but otherwise no absolute line of demarcation between malleable iron and steel on the one hand, and between steel and white iron on the other, can be drawn, based on the chemical composition; so that it cannot be said that a substance containing so much carbon is malleable iron, and so much more carbon steel, and so much more still cast iron; the definition is purely arbitrary; moreover, the physical qualities of a steel containing a given amount of carbon often differ much, according as the proportion of other substances present varies.

The ordinary practical test applied to distinguish iron from steel is the ascertaining whether the substance hardens on heating and quenching in cold water, becoming again softened on reheating and cooling slowly: *a substance which does this may fairly be regarded as steel* (possibly of very bad quality, but still steel), *while one which does not may be fairly regarded as a soft iron.*

Although it is impossible to draw a sharp line distinguishing between malleable iron when hard and steel when soft, there is no difficulty in tabulating the essential differences between good malleable iron, well-marked steel and cast iron.

In practically testing a sample of steel, the difference between a specimen that has been prepared by a fusion process and by a process of puddling is usually very manifest when the specimens are slightly etched by dilute nitric acid or other agent that will gradually attack the metal: the fusion product exhibits a regular more or less granular structure, while the other exhibits more or less of a fibroid character. On dissolving the metal in cupric chloride, a small amount of silicious cinder is left undissolved in the latter case, but practically none with a properly fused steel. The presence of *sulphur* and *phosphorus* in true steels in other than the most minute proportions exercises a marked deteriorating effect upon the strength and tenacity of the metal, the former substance rendering the steel more or less brittle when hot (red-short or hot-short), the latter causing it to be liable to crack and break when cold (cold-short). The presence of manganese, however, and to some extent of carbon and silicon, modifies the exact amount of effect produced by a given quantity of phosphorus or sulphur; as a general rule it may be said that a steel containing 0.5 per cent. of carbon and upward, and also containing more than 0.1 per cent. of sulphur, will be objectionably red-short, and that, if it contain more than 0.1 per cent. of phosphorus, it will be too cold-short for most applications; while a much smaller quantity, as little as 0.03 per cent., renders the steel almost useless for tools and cutting instruments, etc., in which a fine temper is essential. These figures, however, are subject to notable corrections: the presence of manganese to an extent of several times the amount of sulphur present considerably mitigates the evil effect of that substance, while, provided the carbon be very low (*i.e.*, that the metal is really not steel at all but only fused iron), much larger quantities of phosphorus than 0.1 per cent. may be present without deteriorating the properties of the substance to so great an extent as would be occasioned by the presence of much smaller quantities of phosphorus simultaneously with several tenths per cent. of carbon.

The effect of *silicon* on the physical qualities of steel is far less marked than that of sulphur and phosphorus. Like that of the latter it is modified by the amount of carbon present. The presence of silicon, moreover, conjointly with that of manganese, exerts a remarkable action in diminishing the extrusion of gases from molten steel in the act of solidifying, thereby producing honeycombing; so that when very soft steels are cast into ingots much sounder masses are obtained by the ordinary casting processes (*i.e.*, not under hydraulic or other powerful pressure) when a little siliciuretted metal is added to the steel just before casting than when ordinary rich spiegeleisen or ferro-manganese is employed. On the other hand, when carbon and silicon are simultaneously present to the extent of 0.5 to 0.1 per cent., or thereabouts, both hot and cold shortness are brought about to a greater or lesser extent.

Nitrogen has been supposed by many chemists, and especially by Fremy, to be an essential constituent of steel; and in favor of this view it is to be noticed that in the preparation of steel by cementation the addition of nitrogenous organic matter (scraps of leather, horn, ferrocyanide of potassium, etc.) is found to facilitate the conversion of bar iron into blister steel. On the other hand, this may be due simply to the formation and absorption of cyanogen, which carbonizes the iron without necessarily communicating nitrogen to it. The actual quantity of nitrogen found in steel by various experimenters is always extremely small, while it is possible to produce steel from iron free from nitrogen by cementation in pure carbon oxide, or in an atmosphere of coal gas (Macintosh's patent)—so that nitrogen is clearly not an essential constituent in these cases. Moreover, nitrogen has been found both in wrought and in cast iron in even larger quantity than in steel, so that the peculiar properties of steel as regards hardening and tempering cannot be markedly influenced by the presence of this constituent. No connection between the amount of nitrogen present and the physical properties of the metal, or the amount of carbon or other foreign elements present therein, has as yet been thus established by any experimenter.

As regards the presence of *oxygen* in iron and steel, and its effect on their qualities, little evidence as yet exists.

Overblown Bessemer metal is comparatively unforgeable and brittle, so that probably the presence of oxygen affects iron in the same way as sulphur. When iron and steel are overheated for a long time, they become "burnt" and brittle; this is supposed by some to be due to the formation of oxide disseminated through the mass of the metal, but many others consider that a more or less crystalline structure set up under the influence of a softening heat is the sole cause of the diminution in strength and tenacity.

Copper is often present in minute quantity in pig iron. When steel contains a few tenths per cent. of copper it is distinctly red-short, more so when the proportion is increased. Malleable iron does not seem to be so much affected by copper, 0.5 per cent. giving but little red-shortness; the welding power is, however, considerably diminished. On the other hand, addition of iron to bronze and similar copper alloys increases their strength and tenacity, as in Aich's gun-metal and Gedge's metal. *Antimony* acts as injuriously upon iron as sulphur and phosphorous conjointly, a few tenths per cent. rendering iron highly cold-short and also hot-short. *Chromium*, *tungsten*, *vanadium*, and *titanium* are all apparently capable of increasing the strength of iron more or less after the fashion of carbon, and accordingly have been regarded as valuable constituents in special kinds of iron and steel, *e.g.*, the so-called chromium steel and tungsten steel, and the iron containing traces of vanadium employed on the Swiss wire bridges at Freiburg.

NATURAL SOURCES OF IRON.

Metallic iron in a more or less pure condition is occasionly met with in nature, but the supply of metal from this source is wholly inconsiderable. Probably nearly all such substances are of meteoric origin, with the exception of ferruginous metallic platinum. Certain masses of oxidixed iron with unoxidized metal in the interior have been found in Saxony and elsewhere; but great doubt exists as to whether these substances are not artificially prepared metal which has rusted exteriorly in the course of time. Near Nery (France), at a spot where a seam of coal had been burning for some time, Mossier found a mass of a very hard steely iron weighing upward of sixteen pounds, together with smaller lumps, evidently formed by the reducing action of the burning coal on ferruginous matter in the soil and rock. True meteoric iron usually, if not invariably, contains nickel to the extent of from one or two parts per 100 of iron (as in meteorites analyzed by Prout) up to considerably larger amounts.

Cutting instruments of a rough character have been fashioned by savage and semi-savage nations from meteoric iron; but the sources from which the metal is practically extracted are those ores in which the metallic properties of the element are masked by its combination with non-metallic substances. These ores are essentially divisible into three classes, viz., those respectively in which the iron exists as sulphide, as carbonate, and as oxide. The first class of ore is best exemplified by *pyrites* or iron disulphide; comparatively little iron is directly produced from ores of this class, although the impure ferric oxide obtained from the residue left in the vitriol works after combustion of pyrites and extraction of copper from the residue, known as "purple ore" or "blue billy," is utilized as "fettling" in the puddling operation, and has sometimes been employed on the spot where it is produced as a source of finely divided metallic iron for the precipitation of the more valuable copper, the reduction being simply effected by heating together the iron oxide and small coal, or by passing over the heated oxide reducing gases prepared by the partial combustion of coal or other fuel, etc. It may be noticed in passing that the *ferrum redactum* of pharmacy, or spongy metallic iron, is produced in much the same way, purer materials being employed, ordinarily a pure ferric oxide or hydrated ferric oxide and hydrogen gas; and that several methods for the reduction of iron on a manufacturing scale from various ores based on the same principle have been attempted hitherto without much commercial success. The ores in which iron exists as carbonate are essentially of two kinds, viz., those in which the ferrous carbonate is crystalline and but little admixed with earthy matters, and those in which a larger or smaller amount of clayey matter is intimately intermixed with the ferruginous compound; the former class is generally termed *spathic iron ore* (sparry ore, siderite, spathose), and often contains a notable amount of magnesium or of manganese carbonate; the latter class is from its texture and appearance generally spoken of as *clay ironstone* or *argillaceous iron ore.* Large deposits of a variety of clay ironstone exist in the Coal Measures, frequently alternating with layers of carbonaceous matter, whence the term *blackband* is applied to this variety. In many cases deposits of spathose and of clay ironstone have become more or less altered by the action of air and moisture, the effect of which is to convert ferrous carbonate into ferric oxide; in other instances by the action of heat derived from the underlying strata by conduction, or due to trap dykes and analogous volcanic agency, the ferrous carbonate is more or less completely converted into an iron oxide akin to magnetic oxide—so that the deposits of spathose ore or clay ironstone shade off in places into deposits of the iron oxide class.

The third class of iron ores in which the iron exists as oxide may be divided into three subclasses, viz., those in which the iron respectively exists as anhydrous ferric oxide, as hydrated ferric oxide, or other hydrate, and as ferrous and ferric oxides combined, of which magnetic oxide of iron is the type. To the first division belong the *red hematite* and *specular* ores, to the second *brown hematite* and *bog iron ore*, and to the third the *magnetic iron ore*, properly so called, or *loadstone*, and various modifications of this found in different localities, and usually also designated as magnetic ore, although frequently not possessed of strongly marked magnetic properties, and also the *ironsands* of India, New Zealand, St. Lawrence, and elsewhere. These latter are usually almost pure oxides of iron, intermixed with more or less silicious matter (often titaniferous), and are distinguished by their remarkable freedom from tendency to take up oxygen and pass into the state of ferric oxide, the which property is not by any means possessed to an equal extent by all so-called magnetic ores; just as deposits of ferrous carbonate by the action of heat, air, and moisture become changed, so beds of ore exhibiting in the main a composition akin to that of magnetic oxide of iron often contain portions which have become converted by similar agencies into ores more resembling red or brown hematite. Owing also to the variable intermixture of gangue of various kinds with the veins of iron ore, the physical properties of the substances become more or less altered, so that it is often difficult to classify a particular ore otherwise than in broad general terms.

According to the nature and amount of the admixed substances, the value of the ore varies largely. The presence of certain impurities, notably of phosphorous, in more than minute quantity prevents the use of certain ores for particular purposes, and thus reduces their value; the admixture of particular kinds of gangue in other cases renders the ores unsuitable for working in the same kind of way that would otherwise be advantageous; in smelting such ores by means of a blast furnace, different kinds and amounts of flux for the earthy impurities are requisite in different cases, thus affecting the cost of production—so that in fine the value of an ore is by no means necessarily proportionate to the amount of actual iron present therein.

EXTRACTION OF IRON FROM ITS ORES.

Neither the period when malleable iron was first prepared from its ores nor the precise mode of manipulation then adopted is known with certainty, although the remains of iron implements manufactured in prehistoric times are so numerous as to leave no room for doubt as to the extreme antiquity of the use of that metal instead of the yet earlier stone implements of primeval man. There is every reason to believe that the earliest methods of iron smelting essentially consisted in placing lumps of ore in a fire of wood or charcoal, and, after the lapse of a sufficient length of time to permit of their more or less complete reduction, hammering the mass of spongy metal thus formed; so that what is known as the "Catalan forge" of modern times is but a comparatively slight modification of and improvement upon the oldest metallurgical appliances for the extraction of iron, the main difference being in the size of the apparatus and the use of an artificial air blast. Tradition assigns a very remote period to the first discovery of the possibility of extracting iron or crude steel from its ores, Tubal Cain (who has been compared with Vulcan) being the first name mentioned in connection with the metallurgy of this substance. In the time of the Assyrians iron appears to have been in somewhat extensive use, saws, knives, and other analogous tools having been found by Layard at Nineveh, many of which are very similar to those in use at the present day. Both Homer and Hesiod refer to the forging of iron, while the hardening and tempering of steel also appear to have been operations in common use among the early Greeks; indeed the employment of a rough kind of bellows for the forging of tools (probably of iron) is figured in Egyptian sculpture of 1500 years and upward B.C.—the inflation being accomplished by the aid of cords worked by the hand, while the pressure of the foot caused the expulsion of the air thus drawn in, much in the same way as is still practiced by some almost savage Eastern nations, *e.g.* the Burmese. In the time of Pliny (about 50 A.D.) the existence of large masses of iron ore in Spain, Elba, Styria, and elsewhere was well known, these minerals being described by him as largely employed in the manufacture of iron and steel; while evidently the conditions requisite to produce the best temper of the latter had been carefully examined at that epoch, as he states that the quality of the steel depends on the nature of the water used to harden it, and that oil is preferable for small articles. Prior to this the discovery of cast iron or cast steel appears to have been made, for Aristotle (about 350 B.C.) describes the preparation of the fused or fritted steely iron still prepared in India and known as *wootz*, while Galen refers to cutting knives made of this steel, and mentions that they are apt to be brittle through excessive harness. Through the agency of the Romans the manufacture of iron was introduced almost all over the then known world, and into those regions where it had not been previously practiced; this, however, does not appear to have been the case with Britain, as the use of iron was probably known there before the Roman invasion; the knowledge, however, may very possibly have been originally derived from the Romans through the Gauls.

The various modern developments of the earliest methods of iron extraction, consisting of the heating of iron ores with fuel until more or less complete reduction was brought about, and hammering the mass, may be conveniently divided into four classes, viz.—(1) those in which cast iron is produced by a smelting process, and subsequently transformed into steel or wrought iron by decarbonizing the resulting pig iron; (2) those in which malleable iron or steel is obtained direct from the ore at one operation, without passing through the stage of cast iron; (3) those in which steel is formed from wrought iron by directly carbonizing it; and (4) those in which steel is finally prepared by intermixture of carbonized and wrought iron in the fluid state. The methods of class 1 include the preparation of pig iron; its purification by refining, and conversion into wrought iron by fining and puddling (both by hand and by machinery) and by inverse cementation (heating in contact with iron oxide); and the preparation of puddled steel and pnuematic steel and iron, *i.e.*, steel prepared by Bessemer's original process, viz., decarbonization more or less complete by blowing air through molten pig iron, and also of Heaton's steel (pig iron decarbonized by nitrate of sodium), etc. Class 2 includes the Catalan forge and allied processes, and the "direct" methods of Clay, Chenot, Yates, Blair, DuBuy, Siemens and others. The processes included in class 3 are those of steel manufacture by cementation and partial acieration by case hardening, together with various other allied methods of producing steel from soft iron; while class 4 includes the Bessemer-Mushet steel process, in which blown Bessemer metal is made into what is usually known as "Bessemer steel" by incorporating with it spiegeleisen; and the allied open hearth steel processes, in which wrought and cast iron are melted up together, or iron is decarbonized in a Siemens hearth and then mixed with ferro-manganese, etc.; together with various modifications of these processes, such as the Snelus-Thomas-Gilchrist method of blowing phosphorized pig, the Uchatius process, the Ponsard process, etc.

THERAPEUTIC USES OF IRON.

The use of iron in the cure of disease dates from a very early period. Pliny speaks of its medicinal effects, and there is reason for believing that it was administered several centuries before his time. But Sydenham was the first to point out its most important therapeutic property, its blood-restoring power. "To the worn-out and languid blood," he says, "it gives a spur or fillip whereby the animal spirits which before lay prostrate or sunk under their own weight are roused and excited."

The blood is composed of a fluid wherein float roundish red bodies, the blood corpuscles, which play a leading part in those tissue changes essential to life. Each corpuscle consists of a stroma permeated by a red fluid, hæmoglobin, which has the remarkable property of readily combining with either oxygen or carbonic acid, but so loosely that under slightly altered conditions these gases are as readily separated from it. In the lungs the corpuscles, through their hæmoglobin, take up oxygen, which they carry to all parts of the body. But in the presence of the vital processes of disintegration and repair constantly going on in the tissues the corpuscles yield up the oxygen they have brought and supply an element necessary for these processes. Having got rid of the oxygen, the hæmoglobin then unites with the carbonic acid produced by tissue disintegration, and the corpuscles thus reladen carry their burden back to the lungs, and discharge there the carbonic acid, taking up anew a supply of oxygen. If the hæmoglobin of the blood fall below a certain standard, the supply of oxygen necessary to healthy tissue changes in brain, nerve, muscle, etc., becomes too limited, and the changes will be imperfectly performed; hence defective vitality, general or local. Now the ingestion of iron increases the hæmoglobin supply when it is defective; it promotes the production of blood corpuscles, and causes each corpuscle to carry with it more hæmoglobin; hence the health-giving power possessed by this metal. The exact method in which the increase in red coloring matter is brought about we do not know, but in the fact that iron forms an essential constituent of hæmoglobin we have some clew to its utility.

Anæmia or spanæmia is the name given to that condition in which the red coloring matter of the blood is below the normal amount. It is indicated by pallor of skin and mucous membranes, and by a depressed condition of brain, of muscle, and of the tissues generally. A beating headache is often present, sustained mental or physical exertion is difficult, palpitation and breathlessness are sources of inconvenience; in the female the uterine functions are often in abeyance. By a chalybeate course we can usually restore to the blood its due supply of hæmoglobin, and cause the gradual disappearance of all these symptoms.

IRON-CLADS. From very early times the idea of protecting war vessels with armor seems to have prevailed in the minds of some naval architects, and as far back as the sixteenth century an experiment was made, which though but meager as to tests applied, yet was sufficiently successful to demonstrate the value of such protection. At the attack on Gibraltar in 1782 floating batteries protected by armor were used, but were destroyed by fire before their efficiency was tested. As to the construction of the modern iron-clad the French can claim the honor of being pioneers, for as early as 1841 General Paixhans called the attention of the French Government to the value of such protection, but his plans were rejected by the administration, having the effect, however, to excite interest in and call attention to the subject. A few years afterward the United States Government ordered the construction of a battery by Robert Stevens, but this experiment was never carried to completion. The first experiment of practical value was that made by the French in the Crimean war. In 1854 Napoleon III. ordered the construction of batteries protected with iron armor. Five batteries were built and armed with sixteen sixty-eight-pounder guns each. Three of these batteries in four hours' fighting succeeded in silencing the Kenburn fortifications, which had before been impregnable to the attack of the combined English and French fleet. Shortly after this England had three ships similar to the French batteries with an armament of ten-inch shell guns. The French meantime, encouraged by their success in the former experiment, determined to build seagoing iron-clads. Accordingly the large wooden ship, *Napoleon*, was selected for the experiment. The two upper decks were cut down, the length of the ship increased by twenty-five feet and she was thoroughly armored from stem to stern with five-inch armor, that thickness of metal being found sufficient to withstand the penetrating power of the guns then in use. Three armor-clad frigates were immediately added to the navy of France, each bearing five inches of armor over twenty-six inches of wood, and armed with a battery of thirty-six five-ton guns. It was not long before the English Government followed in the wake of France, and the *Warrior*, *Black Prince*, and *Achilles* were built. The first two ships were only armored for a portion of their length, the extremities being unprotected. The *Warrior* was an iron ship, armored over her vital points, and was mounted with the most powerful guns then existing. She was also provided with a ram strong enough to sink any ship afloat. She was considered the most formidable vessel afloat, her weak points being only her unprotected steering gear and too great length. The *Achilles* was armored her entire length above water, and the *Hector* was similarly armored above the water line, while amidships her armor extended below the water. By 1861 England had eleven iron-clads—the *Achilles*, two of the *Hector* class, five wooden vessels of the *Warrior* style of armor and equipment, and three others armored above the water-line with a belt of iron varying from five and one-half inches amidships to four and one-half at either extremity and covering steering gear and rudder head. At this time a marked development of naval guns is noticeable, and by the time the armored vessels were completed it was found that the armor of none of them was able to withstand the improved guns which had been in the meantime invented. From this point the competition between guns and armor begins. It is interesting to note how rapidly each effort to produce an invulnerable ship was promptly met by the production of armor-piercing guns which rendered such attempts abortive. In 1864 France adopted the eight and sixteen ton guns, and a year later she increased the thickness of armor on her ships to eight inches, the *Oceán* being the first vessel so armored. But before the ship was finished, the twenty-three-ton guns had rendered her armor obsolete. The armor on French vessels was then changed successively to nine and ten inches. The most noted increase of armor was that of the *Dévastation*. On this ship the thickness of the belt was increased to fifteen inches amidships, tapering to eleven and three-fourth inches at the ends. She had an armament of four twelve and three-fourths inch guns, two ten and one-half inch guns, and six five and one-half inch guns. The sides of the ship "tumble home" before and abaft the batteries, that a direct fire ahead or astern can be maintained. The ten-and-one-half inch guns are mounted on deck in half-turrets and can fire ahead and astern. The *Admiral Duperré* is larger than the *Dévastation*. She has no central armored battery, but a belt twenty-one and one-half inches thick is carried completely around the water line. Above this is an armored deck. On her upper deck she mounts on barbettes four forty-eight-ton guns. She also carries fourteen five-and-one-half inch rifles, and twenty Hotchkiss machine guns. The experience France had gained in heavy ordnance led to a complete revolution in the construction of armored vessels and their armaments. Instead of being armed with a large number of light guns the vessels now carried a few heavy guns, and the armor was reduced at some points and increased at others. The English model of this period may be taken from the *Bellerophon*, a vessel constructed after the plans of Sir E. J. Reed. In this ship the engines, boilers, magazines, shell rooms, etc., were protected by a belt of armor ten feet in width (five below and five above water line) while a central battery was placed amidships, mounting the heaviest guns then afloat. She also carried bow-guns for direct fire, which were shielded by six-inch armor. Her central battery was composed of twelve-ton guns.

About this time this American civil war broke out and Congress appointed a committee to present plans for armored vessels. Three distinct types were proposed. Of these the *Galena* was a total failure, being ruined in her first engagement. The *New Ironsides* was more successful. She was built on the French model (modified). Her armament consisted of fourteen eleven-inch smooth-bores and two eight-inch Parrott rifles. Her portholes had heavy iron shutters which could be closed when not in action. She was repeatedly struck in action, but stood the test satisfactorily. But the vessel around which the greatest interest centers for the American is the *Monitor*. This vessel was a novel construction and was a revelation to the naval authorities of the world, who had heretofore believed that the power of a vessel increased in proportion with her size and the number of guns carried. It was designed by Capt. John Ericsson, a Swedish-American, and first went into action in March, 1862, when she engaged the powerful Confederate ram, *Virginia* (the old *Merrimac*) and defended the United States wooden war ships, saving them from destruction. She was a flat-bottomed hull of about 1,300 tons displacement, armored on the sides and the deck, which was only eighteen inches above the water. On her deck was a revolving turret carrying two eleven-inch smooth-bore guns, which could be fired in any direction by the revolutions of the turret except "bow on," this line of fire being obstructed by the armored pilot-house, which stood near the bow. The hull was iron, and was plated at the sides with five one-inch plates tapering to three plates at the bottom. This plating was backed by twenty-five inches of oak and other material. The turret was made of eleven one-inch plates overlapping each other and bolted together by bolts running clear through and having nuts on the inside end. This arrangement of bolts on the inside was unsatisfactory, as when the turret was struck by a heavy shot the nuts flew off the bolts and became dangerous missiles. The results of the *Monitor's* success with the *Merrimac* revolutionized naval warfare, and from that time forward turret ships took a front place in the ranks of war vessels. The principle was applied to sea-going vessels, and the United States government at once constructed four sea-going wooden, double-turreted ships—the *Monadnock*, *Miantonomah*, *Amphitrite* and *Terror*. The *Miantonomah* crossed the Atlantic successfully, but the vessels were broken up in 1874 as antiquated.

The most noted iron-clad of the Confederacy was the *Virginia* (*Merrimac*). This vessel was simply a steam-propelled floating battery armed with heavy guns, protected by a sloping roof of iron armor, and having a ram prow. She did terrible execution among the United States wooden warships till she was stopped in her career by the *Monitor*.

The English began the construction of sea-going turret ships with the four-turreted ships *Royal Sovereign* and *Prince Albert*. Captain Coles, an eminent authority, soon after this constructed the full-rigged turret ship *Captain*, which, owing to its great spread of canvas and sinking too deep, capsized, entailing great loss of life. After this unfortunate accident the English admiralty abolished all masts and ship-rigging, leaving nothing above deck that could possibly be dispensed with. Of the class of vessels here indicated the *Devastation* was the first specimen. In 1876 the *Inflexible* was launched. She is a double-turreted vessel with a central citadel. Her turrets are arranged for echelon firing, each turret having two eighty-ton guns. The armor on the citadel at its thickest point is twenty-four inches thick. The extremities of the vessel are unprotected by armor, but are so arranged that it is claimed they may be riddled with projectiles and not affect the safety of the ship.

The latest first-class ships are the *Renown* and the *Sanspareil.* They are of 10,500 tons displacement each. They are armed with two 110-ton guns and a battery of twelve six-inch rifles, with an eighteen-ton stern-chaser. The armor is eighteen inches thick with steel facings, and the decks are three-inch armor.

Italy has some formidable vessels of the latest type, the *Daudob* and *Duillo* being the best types. They are of the citadel pattern, having twenty-one inches of armor. The *Italia* is the largest warship in the world. She has a displacement of 13,500 tons, has no side-armor, but has the turtle-back deck. She carries four 100-ton guns and eighteen six-inch rifles.

The United States has of late received some important additions to her navy. Among the new ships may be mentioned the *Chicago*, *Boston*, *Atlanta*, *Newark*, *Charleston*, *Baltimore*, *Philadelphia*, *San Francisco*, *Yorktown*, *Bennington*, *Concord*, *Petrel*, *Maine*, *Texas*, *Vesuvius*, and several torpedo boats. These additions to the navy comprise twenty-two vessels of various classes, thus divided: five double-turreted monitors, four armored battle-ships, nine cruisers, a dynamite-gun cruiser, a torpedo boat, a submarine boat, and a practice ship. The *Vesuvius* deserves especial mention. She is a steel cruiser of 725 tons, with a speed of 21.65 knots an hour, and is armed with three pneumatic dynamite guns of fifteen inches caliber, throwing a dynamite bomb containing 500 pounds of dynamite. The recent experiments with this style of gun and projectile apparently prove the success of the system, and will most probably revolutionize the mode of naval warfare and render useless the most formidable armor and heaviest guns of the nations of the world. The only excellence to be attained by warships will then be that of speed, and increased range of the dynamite gun. Armor will be useless against the terrific force of the explosive projectiles, and the great speed of the vessel carrying this terrible engine of destruction will probably enable it to evade the fire from the best class of ordnance now known to man. The range of the dynamite guns has been proven accurate at more than 2,000 yards, but its possibilities are as yet undeveloped. Even in its present state it is far ahead of any other appliance for destroying a naval armament. The gun is aimed by evolutions of the ship controlled by its steering gear, and is not movable like ordinary cannon. It is firmly fixed in the keel of the ship and elevated over the bow (like a bowsprit on a sailing vessel` at an angle and its ranges controlled by the amount of compressed air used in discharging it. This can be regulated perfectly by an ingenious mechanism, which allows of great rapidity of discharge. Altogether great results may be expected from this ship.

All the other vessels have the most approved armament and appliances of modern date, and it can no longer be said that the navy of the United States exists merely in theory or on paper. The next ensuing few years will probably see this country taking the front rank among the naval powers of the world. The other naval countries of Europe present no special feature of interest as far as regards iron-clad vessels, except Russia, which has made the experiment of constructing circular iron-clad monsters. The success of this form of vessel may be spoken of as only moderate, for whatever other advantages they may possess, their loss of speed more than counterbalances. The general aim of the nations now seems to be to produce vessels far excelling in speed the wildest dreams of the old days, and to a great extent this is being accomplished.

IRON CROSS, a Prussian order, instituted on March 10, 1813, by Frederick-William III., to be conferred for distinguished services in war. It was made of iron to commemorate the grim "iron" period at which it was created. The decoration consists of a Maltese cross of iron, edged with silver, and is worn round the neck or at the button-hole. The order was revived by William I. on July 19, 1870, on the eve of the great war with France. The grand cross is presented exclusively for the gaining of a decisive battle, or the capture or brave defense of a fortress.

IRON MASK. The man in the Iron Mask is the name by which a French state prisoner, whose identity has given rise to much curious inquiry, is universally known. The facts established by contemporaneous evidence respecting this mysterious personage, who died in 1703, were, until a modern writer largely added to them, neither numerous nor of very great importance. Enough indeed is related to show that even in his lifetime the veiled prisoner had become an object of curious mystery. Other instances occur, however, of captivity under like conditions; and nothing in the treatment of the Mask proves that he was a personage of rank and importance. It has been indisputably shown that it was no uncommon practice, especially in the reign of Louis XIV., to isolate human beings and keep them immured, their very features being carefully hidden, and that the victims were persons of all conditions. Though one or two efforts had been previously made to find out the name of the unknown prisoner, Voltaire was the first writer of note to give form and life to the vague traditions that had been current about the Mask; and we may probably ascribe to his suggestive account the increased importance which since his time the subject has been supposed to possess. In his *Age of Louis XIV.* the historian hinted that the Mask was a person of high rank; and he graphically described how this mysterious being endeavored to commune with the outer world by throwing out, on the shore of Sainte Marguerite, from the grated window of his gloomy dungeon, a piece of fine linen, and a silver plate, on which he had traced some strange characters to reveal a horrible tale of misfortune. This work was published in 1751, nearly fifty years after the death of the Mask; and from this time the problem who he was has been investigated with no little diligence. The editor of the *Philosophic Dictionary* suggested that he was an illegitimate son of Anne of Austria, born in 1626; and in 1790 he was identified, in the *Memoirs of Cardinal Richelieu*, with a supposed twin brother of Louis XIV., put out of the way by the great Cardinal to avoid the ills of a disputed succession. As early as 1745 the Mask was said, by an anonymous writer, to have been the count of Vermandois, one of the bastards of Louis XIV.; in 1759 M. Lagrange-Chaucel endeavored to prove that he was the duke of Beaufort, a hero of the Fronde; a few years afterward M. St. Foix conjectured that he was the duke of Monmouth, the English pretender of 1685; and others have labored to show that he was either a son of the Protector Cromwell, or Fouquet, the minister of Louis XIV., or Avedick, the Armenian patriarch, whose treacherous imprisonment while ambassador to France was one of the worst acts of its unscrupulous king. The claim, finally, of Ercolo Mattioli, a diplomatic agent of the duke of Mantua, was put forward in 1770, and since that time has found zealous advocates in MM. Roux-Fazillac, Delort, Topin, and in the late Lord Dover; indeed, until lately it was generally thought that Mattioli was the mysterious captive.

IRON MOUNTAIN, a town in Menominee county, in the upper peninsula of Michigan, fifty-one miles west of Escanaba, has grown rapidly, owing to the development of iron mining in the vicinity. It is situated at the junction of several railways, and ships vast quantities of iron ore. Population (1900), 9,242.

IRONTON, a city and county seat of Lawrence county, Ohio, three miles from Portsmouth and 140 from Cincinnati, at the intersection of two railroads. It is the distributing center of a district abounding in iron ore and bituminous coal, and contains several rolling mills, iron foundries and furnaces. Ironton has two national and other banks, a high school and five weekly newspapers. Population (1900), 11,868.

IRONWOOD, an important iron mining and shipping point in Gogebic county, in the upper peninsula of Michigan, has a population of 7,000 and does a large trade, although only about four years in existence. It has banks, railroad and telegraph facilities, schools and churches. Population (1900), 9,705.

IRONWOOD is the name applied to several kinds of timber, the produce of trees from different parts of the tropics, and belonging to very different natural families. Usually the wood is extremely hard, dense, and dark-colored, and sinks in water. The true ironwood of the East Indies and Malay archipelago, of which anchors are often made, seems to be the *Metrosideros vera* of Rumphius, a tree belonging to the *Myrtaceæ* and formerly extensively used in China, Japan and the Moluccas. Several species of *Sideroxylon* also yield ironwood, *Sideroxylon cinereum* or *Bojerianum*, D.C., being the *bois de fer blanc* of Africa and Mauritius.

IRRAWADDY. See IRAWADI.

IRRIGATION is the systematic application of water to land in order to promote present or prospective vegetation. Water, thus used for the general purpose of growing or increasing the crops on which animals and man have to subsist, is employed in special ways and at special times according to the particular end in view, the individual plant to be grown, and the very divergent conditions of soil and climate which have to be studied in different countries. Sometimes the art of irrigation is practiced for the simplest of all reasons, to make up for the absence or irregular seasonal distribution of rain or for a local deficiency of rainfall; sometimes a particular crop is irrigated, because the plant is of an aquatic or semi-aquatic nature; sometimes lands are irrigated for the sake of the encouragement to early growth afforded by the warmth of the water, or for the sake of the dissolved plant-food which it furnishes; and sometimes the object is that the land may be enriched and its level raised by means of the deposit from the water used.

In considering the vast importance of water to plant growth, it must be remembered that seeds must absorb a very large quantity of water before germination can begin; that the growth of the young plant, while still dependent upon the seed, involves the employment of a constant supply of water in order that the transferrence of nutrients from the stores in the seed to the newly developed parts may proceed without interruption; that soils which do not contain more than 5 to 9 per cent. of moisture will yield none of it to the plant, and that when such low percentages of moisture are approached there is a constant struggle — often fatal to the plant — between the soil and the plant for water; that during the period of the plant's active growth, the absorption of all mineral matter and all nitrogen compounds from the soil takes place through the medium of an exceedingly weak aqueous solution of these substances, which solution is indeed absorbed in such quantities that a single plant of barley needs the passage through it during the five months in which it occupies the ground of more than an imperial gallon of water. It should be also remembered that all vegetable produce when in a growing state contains an immense proportion of water, often 70 to 80 per cent. and sometimes as much as 92 to 96 per cent., the latter figures representing the percentage of water in turnips and watercress respectively.

From all this it will be readily understood that artificial supplies of water are needed for vegetation in many dry countries. An illustration of this need presents itself in the district which comprises parts of the south of Spain, Portugal, and Italy, including Sicily and Greece. Along this zone, which includes the Mediterranean coasts north of the rainless region of Africa, with its currents of hot, dry air from the Sahara, the annual rainfall may be as high as thirty inches, but the amount during the summer quarter is but 4 per cent. of the whole. All the district suffers from droughts, which are often most severe. Again, in many parts of central and eastern Europe there are table-lands, as in Moravia, Poland, and parts of Russia, where the yearly rainfall is insufficient — from ten to fifteen inches only. There are about twice as many rainy days in western, as in eastern Europe. In very many of these rainless or arid countries and districts there are remains (mostly in ruins) of important ancient irrigation works; Spain, Sicily, and Syria furnish abundant examples of aqueducts and canals for agricultural irrigation. In Egypt, and in some parts of Persia, India, and China, artificial watering is employed for the reasons given above; while in Peru and many other parts of America the same scarcity or irregular distribution of rain occurs.

In actual practice the amount of water varies from 300 gallons per acre in the hour to no less than 28,000 gallons. Where water is used, as in dry and hot countries, simply as water, less is generally needed than in cold, damp, and northerly climates, where the higher temperature and the action of the water as manure are of more consequence. The engineer must not decide upon the plan till he has gauged at different seasons the stream which has to supply the water, and has ascertained the rain-collecting area available, and the rainfall of the district, as well as the proportion of storable to percolating and evaporating water. The quality of the water employed for any of the purposes of irrigation is of much importance. Its dissolved and its suspended matters must both be taken into account. Clear water is usually preferable for grass land, thick for arable land. If it is to be used for adding to the solid material of the irrigated land, then the nature and amount of the suspended material are necessarily of more importance than the character of the dissolved substances, provided the latter are not positively injurious. For use, however, not only is very clear water often found to be perfectly efficient, but water having no more than a few grains of dissolved matter per gallon answers the purposes in view satisfactorily. Water from moors and peat-bogs or from gravel or ferruginous sandstone is generally of small utility so far as plant food is concerned. River water, especially that which has received town sewage, or the drainage of highly manured land, would naturally be considered most suitable for irrigation, but excellent results are obtained also with waters which are uncontaminated with manurial matters, and which contain but eight or ten grains per gallon of the usual dissolved constituents of spring water.

For the greater part of the history of agriculture in the United States irrigation was not a factor, or even considered at all. When at last, within the last quarter of a century, the march westward was stopped by the foothills of the Rocky Mountains, the pioneer refused the aridness and turned backward to take the refuse of the public and cheap lands within the rainy or doubtful area, rather than try a method that seemed to reduce the size of his actual tillable soil, and make a truck-patch where he was seeking to place his idea of an actual farm. But presently it began to be known that in the rainy area the lands were gone, and further, that on most of these lands the rainfall was uncertain or deficient, and attention began to be directed to the Spanish idea, as practiced in New Mexico and the older settlements of southern California.

The descendants of the original Spanish occupants had on these lands been practicing irrigation for more than a century, and the people they supplanted had practiced it before them time immemorial. Their methods were crude and wasteful, and unscientific in the extreme, but their crops were sure, and their lessons, at first treated with contempt, began to be absorbed by the wandering American.

But, as usual in this country, the theory and the fact based upon it, only were accepted. Existing methods, and especially the smallness of existing methods, were discarded. Immense corporate irrigation companies were formed, and are now very numerous, for the purpose of reclaiming large tracts of original "desert" by damming the chiefest and best source of supply, and leading the stored water thence economically, and by the employment of the highest engineering skill, to thousands of acres, otherwise utterly valueless. These enterprises have enlisted enormous capital, which the original irrigators in no case ever had. The sources of supply are often so distant that they have never occurred to the casual observer at all. The melting snow upon distant mountains finds its way by a thousand channels to the valleys at last, and a little river, almost dry for the greater portion of the year, may be made to gather millions of gallons behind a colossal dam. Such are the plans which, backed by money and science, will yet make of these western deserts gardens like those of southern California.

The region last named affords the best example now extant of the miracle-working faculty in American agriculture when irrigation is called to its aid. Southern California was practically a desert considerably less than twenty years ago. The crude methods of the Mission Fathers had made gardens there a hundred years before, but only in spots and patches, imperfectly and crudely, and they had gone no further because to them all known sources of water-supply had been exhausted. No land on earth wears now a charm equal to that of this recently hopeless and barren desert. The beginning seems to have been made by the modern American with the Artesian well, which at once took on a new significance in connection with irrigation. Many of these wells are enormous spouting fountains that never diminish in volume, whose waters are carried away in *acequias* which are lined with cement and save all the water until it arrives at its destination and use. A new idea has been put into practical effect in the *horizontal* well running straight into the mountain's flank and tapping subterranean supplies. Again there are gigantic dams like that of the Sweetwater, near San Diego, and the colossal structure near Riverside, recently completed.

Many of the wide and cactus-grown plateaux lying between the mountains in southern New Mexico and in southern and western Arizona, are known to be fields for the successful use of the Artesian well. During the present generation there will be founded oases in these deserts whereto wealth will flock and palaces will rise, and the most wonderful and profitable contrasts of the world will be seen. Already these comparatively minute supplies of water, gathered and hoarded with scientific skill and distributed under rule and law, have in California added not only to local but to national wealth.

IRUN, a frontier town of Spain, in the province of Guipúzcoa, on the left bank of the Bidassoa, opposite the French village of Hendaye. The population is 7,040.

IRVINE, a royal and parliamentary burgh, market-town, and seaport of Ayrshire, Scotland, is situated on the north bank of the estuary of the Irvine river, and on the Glasgow & Southwestern Railway, twenty-nine miles south-southwest of Glasgow and ten north of Ayr. Population, 5,000.

IRVING, Edward, a minister of the Scotch church, was born at Annan, Dumfriesshire, August 4, 1792. By his father's side he was descended from a family long known in the district, and the purity of whose Scotch lineage had been tinged by alliance with French Protestant refugees; but it was from his mother's race, the Lowthers, farmers or small proprietors in Annandale, that he seems to have derived the most distinctive features of his personality.

At the age of thirteen Irving entered the university of Edinburgh. In 1809 he graduated M.A.; and in 1810, on the recommendation of Sir John Leslie, he was chosen master of an academy newly established at Haddington, where he became the tutor of Jane Welsh, afterward the wife of Thomas Carlyle. His appointment at Haddington he exchanged for a similar one at Kirkcaldy in 1812. Completing his divinity studies by a series of partial sessions, he was "licensed" to preach in June, 1815, but continued to discharge his scholastic duties for other three years. During the latter period of his stay at Kirkcaldy, Irving renewed an acquaintanceship with Thomas Carlyle, which ripened into life-long friendship. While waiting with some impatience for a permanent opportunity to exercise his gifts in the ministry, he devoted his leisure, not only to mathematical and physical science, but to a course of reading in English literature.

The impression which Irving's early appearances as a preacher produced upon his hearers seems to have been more of a perplexing and bewildering than an edifying character; but he himself never seems to have been troubled with doubts as to whether preaching was his "vocation." In the summer of 1818 he resigned his mastership and took up his residence in Edinburgh, where he resolved to write according to a new system specially adapted to the wants of the age. Yet the prospect of his obtaining a settled charge seemed as remote as ever, and he was meditating a missionary tour in Persia when his departure was arrested by steps taken by Doctor Chalmers, which, after considerable delay, resulted, in October, 1819, in Irving being appointed his assistant and missionary in St. John's Parish, Glasgow. Except in the case of a select few, Irving's preaching awakened little interest among the congregation of Chalmers, Chalmers himself comparing it to "Italian music, appreciated only by connoisseurs;" but as a missionary among the poorer classes he wielded an influence that was altogether unique. This half-success in a subordinate sphere was, however, so far from coinciding with his aspirations that he had again, in the winter of 1821, begun to turn his attention toward missionary labor in the east, when the possibility of fulfilling the dream of his life was suddenly revealed to him by an invitation from the Caledonian church, Hatton Garden, London, to "make trial and proof" of his gifts before the "remnant of the congregation which held together." Over that charge he was ordained in July, 1822. His sudden leap into popularity seems to have been occasioned by a veiled allusion to Irving's striking eloquence made in the House of Commons by Canning, who had been induced to attend his church from admiration of an expression in one of his prayers, quoted to him by Sir James Mackintosh. As far as the mere manner of Irving's eloquence was concerned, it was improbable that any eulogy could err on the side of warmth and enthusiasm, for perhaps there never was any one more highly gifted with what may be called the personal qualifications of an orator. Though cherishing a strong antipathy to the received ecclesiastical formulas, Irving's great aim was to revive the antique style of thought and sentiment which had hardened into these formulas, and by this means to supplant the new influences, the accidental and temporary moral shortcomings of which he detected with instinctive certainty, but whose profound and real tendencies were utterly beyond the reach of his conjecture. Being radically at variance with the main current of thought of his time, the failure of the commission he had undertaken was sooner or later inevitable; and shortly after the opening of his new church in Regent Square, in 1827, he found that "fashion had taken its departure," and the church, "though always well filled," was "no longer crowded." By this desertion his self-esteem, one of his strongest passions, though curiously united with singular sincerity and humility, was doubtless hurt to the quick; but the wound inflicted was of a deeper and deadlier kind; for it confirmed him finally in his despair of the world's gradual amelioration, and imparted to his tendency toward supernaturalism a supremacy which virtually produced the partial suspension of his intellectual faculties. For years the subject of prophecy had occupied much of his thoughts, and his belief in the near approach of the second advent had received such wonderful corroboration by the perusal of the work of a Jesuit priest, writing under the assumed Jewish name of Juan Josafat Ben-Ezra, that in 1827 he published a translation of it, accompanied with an eloquent preface.

The history of the remainder of Irving's career is a striking example of the power of one delusive prepossession partly to stifle and partly to frustrate the beneficent exercise of noble mental and moral gifts. The first stage of his deflexion was associated with the prophetical conferences at Albury, followed by an almost exclusive study of the prophetical books and especially of the Apocalypse, and by several series of sermons on prophecy both in London and the provinces, his apocalyptic lectures in 1828 more than crowding the largest churches of Edinburgh in the early summer mornings. In 1830, however, there was opened up to his ardent imagination a new vista into spiritual things, a new hope for the age in which he lived, by the seeming actual revival in a remote corner of Scotland of those apostolic gifts of prophecy and healing which he had already in 1828 persuaded himself had only been kept in abeyance by the absence of faith. His excommunication by the presbytery of London, in 1830, for publishing doctrines regarding the humanity of Jesus Christ now generally held by the broad school of theologians, and the condemnation of these opinions by the General Assembly of the Church of Scotland in the following year, were irrelevant and secondary episodes which only affected the main issue of his career in so far as they tended still further to isolate him from the sympathy of the church; but the "irregularities" connected with the manifestation of the "gifts" gradually estranged the majority of his own congregation, and on the complaint of the trustees to the presbytery of London, whose authority they had formerly rejected, he was declared unfit to remain the minister of the National Scotch Church of Regent Square. After he and those who adhered to him had removed to a new building in Newman Street, he was, in March, 1833, deposed from the ministry of the Church of Scotland by the presbytery of Annan on the original charge of heresy. With the sanction of the "power," he was now, after some delay, reordained "chief pastor of the church assembled in Newman Street," but unremitting labors and ceaseless spiritual excitement soon completely exhausted the springs of his vital energy. "Commissioned" by the "power" as "a prophet to do a great work in his native land," he, notwithstanding that he was "sinking under a deep consumption," undertook a mission to Glasgow, where, though his "gigantic frame" was now seen to "bear all the marks of age and weakness," and his "tremendous voice" had become "tremulous," he bated no jot of heart or hope; and even when "stretched in utter weakness," and "visibly dying," he, with unfaltering faith in the testimony of the prophetic voice, waited for the moment when God "should bring life and strength." He died worn out and wasted with labor and absorbing care, while still in the prime of life, December 4, 1834.

IRVING, WASHINGTON, the first American who obtained a European reputation merely as a man of letters, was born at New York, April 3, 1783. Both his parents were immigrants from Great Britain, his father, originally an officer in the merchant service, but at the time of Irving's birth a considerable merchant, having come from the Orkneys, and his mother from Falmouth. Irving was intended for the legal profession, but his studies were interrupted by an illness necessitating a voyage to Europe, in the course of which he proceeded as far as Rome, and made the acquaintance of Washington Allston. He was called to the bar upon his return, but made little effort to practice, preferring to amuse himself with literary ventures. The first of these of any importance, a satirical miscellany entitled *Salmagundi*, written in conjunction with his brother William and J. K. Paulding, gave ample proof of his talent as a humorist. These were still more conspicuously displayed in his next attempt, *Knickerbocker's History of New York* (1809). The satire of *Salmagundi* had been principally local, and the original design of *Knickerbocker's History* was only to burlesque a pretentious disquisition on the history of the city in a guide-book by Dr. Samuel Mitchell. The idea expanded as Irving proceeded, and he ended by not merely satirizing the pedantry of local antiquaries, but by creating a distinct literary type out of the solid Dutch burgher whose phlegm had long been an object of ridicule to the mercurial Americans. Though far from the most finished of Irving's productions, *Knickerbocker* manifests the most original power, and is the most genuinely national in its quaintness and drollery. The very tardiness and prolixity of the story are skillfully made to heighten the humorous effect. The next few years were unproductive. Upon the death of his father, Irving had become a sleeping partner in his brother's commercial house, a branch of which was established at Liverpool. This, combined with the restoration of peace, induced him to visit England in 1815, when he found the stability of the firm seriously compromised. After some years of ineffectual struggle it became bankrupt. This misfortune compelled Irving to resume his pen as a means of subsistence. His reputation had preceded him to England, and the curiosity naturally excited by the then unwonted apparition of a successful American author procured him admission into the highest literary circles, where his popularity was insured by his amiable temper and polished manners. As an American, moreover, he aroused no jealousy and no competition, and stood aloof from the political and literary disputes which then divided England. Campbell, Jeffrey, Moore, Scott, were counted among his friends, and the last-named zealously recommended him to the publisher Murray, who, after at first refusing, consented (1820) to bring out *Geoffrey Crayon's Sketch Book*, which was already appearing in America in a periodical form. The most interesting part of this work is the description of an English Christmas, which displays a delicate humor not unworthy of the writer's evident model Addison. Some stories and sketches on American themes contribute to give it variety; of these Rip Van Winkle is the most remarkable. It speedily obtained the greatest success on both sides of the Atlantic. *Bracebridge Hall*, a work purely English in subject, followed in 1822, and showed to what account the American observer had turned his experience of English country life. The humor is, nevertheless, much more English than American. *Tales of a Traveller* appeared in 1824, and Irving, now in comfortable circumstances, determined to enlarge his sphere of observation by a journey on the Continent. After a long course of travel he settled down at Madrid in the house of the American consul Rich. His intention at the time was to translate Navarrete's recently published work on Columbus; finding, however, that this was rather a collection of valuable materials than a systematic biography, he determined to compose a biography of his own by its assistance, supplemented by independent researches in the Spanish archives. His work appeared in 1828, and obtained a merited success. *The Companions of Columbus* followed; and a prolonged residence in the south of Spain gave Irving materials for two highly picturesque books, *The Conquest of Granada*, professedly derived from the MSS. of an imaginary Fray Antonio Agapida, and *The Alhambra*. Previous to their appearance he had been appointed secretary to the embassy at London, an office as purely complimentary to his literary ability as the legal degree which he about the same time received from the university of Oxford. Returning to the United States in 1832, after seventeen years' absence, he found his name a household word, and himself universally honored as the first American who had won for his country recognition on equal terms in the literary republic. After the rush of fêtes and public compliments had subsided, he undertook a tour in the western prairies, and returning to the neighborhood of New York built for himself a delightful retreat on the Hudson, to which he gave the name of "Sunnyside." His acquaintance with the New York millionaire John Jacob Astor prompted his next important work, *Astoria*, a history of the fur-trading settlement founded by Astor in Oregon, deduced with singular literary ability from dry commercial records, and, without labored attempts at word-painting, evincing a remarkable faculty for bringing scenes and incidents vividly before the eye. *Captain Bonneville*, based upon the unpublished memoirs of a veteran hunter, was another work of the same class. In 1842 Irving was appointed ambassador to Spain. He spent four years in the country, without this time turning his residence to literary account; and it was not until two years after his return that Forster's *Life of Goldsmith*, by reminding him of a slight essay of his own which he now thought too imperfect by comparison to be included among his collected writings, stimulated him to the production of his own biography of his favorite author. Without pretensions to original research, the book displays an admirable talent for employing existing material to the best effect. The same may be said of *The Lives of Mahomet and his Successors*, published two years subsequently. Here, as elsewhere, Irving has correctly discriminated the biographer's province from the historian's, and, leaving the philosophical investigation of cause and effect to writers of Gibbon's caliber, has applied himself to represent the picturesque features of the age as embodied in the actions and utterances of its most characteristic representatives. His last days were devoted to a biography of Washington, undertaken in an enthusiastic spirit, but which the author found exhausting and his readers tame. His genius required a more poetical theme, and indeed the biographer of Washington must be at least a potential soldier and statesman. Irving just lived to complete this work, dying of heart disease at Sunnyside, on November 28, 1859.

ISAAC, "he laughs." The only child of Abraham and Sarah, was born when his parents were respectively a hundred and ninety years of age. Explanations of the name seem to be intended by the sacred writer in more than one reference to the incredulous or joyous laughter of his parents when a son was promised to them. Like his father, Isaac lived a nomadic pastoral life, but within much narrower local limits, and with an occasional experiment in agriculture. After the death of his mother, he married Rebekah, the daughter of his cousin Bethuel, by whom, after twenty years of married life, he became the father of Esau and Jacob. He died at the age of one hundred and eighty. The most striking episode of his life, as related in the Biblical record, is that which took place while he was still young, "in the land of Moriah," when at the last moment he was, by angelic interposition, released from the altar on which he was about to be sacrificed by his father in obedience to a divine command. Other occurrences which have been recorded have striking resemblances to incidents in the life of Abraham. Of a less marked and energetic individuality than his father and sons, Isaac is by general consent of the Christian church taken as a representative of the unobtrusive, restful, piously contemplative type of human character.

ISAAC I., COMNENUS, Roman emperor of the East from 1057 to 1059, was the son of a gallant officer under Basil II., named Manuel Comnenus, who, on his deathbed, commended his two sons, Isaac and John, to the emperor's care. Basil caused them to be carefully educated at the monastery of the Studium, and afterward advanced them to high official positions. During the disturbed reigns of Basil's seven immediate successors, Isaac, serving in the army, acted prudently and cautiously; and, when the insults of Michael, the eighth from Basil, stung the nobles and generals into rebellion, Caracalon, the leader of the conspiracy, induced the rebels to proclaim Isaac emperor. Michael, conquered in one battle, was forced to assume the monastic habit, and Isaac ascended the throne in August, 1057. The first care of the new emperor was to reward his noble partisans with appointments that removed them from Constantinople, and his next was to repair the beggared finances of the empire. He revoked numerous pensions and grants conferred by his predecessors upon idle courtiers, and, disregarding the charge of sacrilege, and meeting the insolent menaces of the patriarch of Constantinople by a decree of exile, resumed a proportion of the revenues of the wealthy monasteries. Isaac's only military expedition was against the Hungarians and Patzinaks, who began to ravage the northern frontiers in 1059. Shortly after his successful return he was seized with an illness, and believing it mortal appointed as his successor Constantine Ducas, to the exclusion of his own brother John. Although he recovered from his illness, Isaac did not resume the purple, but, retiring to the monastery of the Studium, spent the remaining two years of his life as a humble monk, alternating menial offices with literary studies.

ISAAC II., ANGELUS, Roman emperor of the East from 1185 to 1195, and again in 1203–4, who came to the throne in the manner described under ANDRONICUS I., succeeded also to the unfinished Sicilian war. The favorable close of that was counterbalanced by the failure of an attempt to recover Cyprus, where Isaac Comnenus had established an independent throne. Of the numerous revolts excited during Isaac's reign by his vices and incapacity, the most serious was the rebellion of the Bulgarians and Wallachians between Mount Hæmus and the Danube, which, breaking out in 1186, resulted in the independence of a second Bulgarian kingdom. Alexis Branus, the general sent against the rebels in 1187, after temporarily repulsing them, treacherously turned his arms against his master, and, leading his troops to Constantinople, attempted to seize the city. There he met with more resistance than Isaac's vices led him to expect, and in the ensuing battle was defeated and slain. After a hastily arranged truce with the Bulgarians, the emperor's attention was next demanded in the East, where several claimants to the throne successively rose and fell. In 1189 Frederick Barbarossa of Germany sought and obtained leave to lead his troops on the third crusade through the Byzantine territory; but he had no sooner crossed the border than the wily and treacherous Greek, who had meanwhile sought an alliance with Saladin, threw every impediment in his way, and was only by force of arms compelled to fullfil his engagements. The next five years were disturbed by fresh rebellions of the Wallachians, against whom Isaac led several expeditions in person. During one of these, in 1195, Alexius, the emperor's brother, taking advantage of the latter's absence from camp on a hunting expedition, proclaimed himself emperor, and was joyfully hailed by the soldiers, who heartily despised the craven vices of their late emperor. Isaac was seized, his eyes were put out, and he was imprisoned in a lonely tower at Constantinople, where he died in 1204.

ISABELLA, surnamed *la Catolica*, "the Catholic," queen of Castile from 1474, was the second child and only daughter of John II. of Castile by his second wife Isabella, granddaughter of John I. of Portugal (thus being through both parents a descendant of the famous John of Gaunt, duke of Lancaster), and was born at Madrigal on April 22, 1451. On the death of her father, who was succeeded by her brother, Henry IV. (1454), she was withdrawn by her mother to Arevalo, where her early education was conducted in the deepest seclusion; in 1462, however, after the birth of Joanna "Beltraneja," she was, along with her uterine brother Alphonso, removed by Henry to the court, where she showed a remarkable example of staidness and sobriety. Already more than one suitor had made application for her hand, Ferdinand of Aragon, who ultimately became her husband, being among the number; for some little time she was engaged to his elder brother Carlos, who died in 1461. After an offer of the crown of Castile, made by the revolutionary leaders in the civil war, had been declined by her, she was in 1468 formally recognized by her brother as lawful heir, after himself, to the united crowns of Castile and Leon. New candidates for her hand now appeared in the persons of a brother of Edward IV. of England (probably Richard, duke of Gloucester), and of the duke of Guienne, brother of Louis XI., and heir presumptive of the French monarchy. Finally, however, in face of very great difficulties, she was married to Ferdinand of Aragon at Valladolid on October 19, 1469. Thenceforward the fortunes of the two spouses were inseparably blended (see FERDINAND). For some time they held a humble court at Dueñas, and afterward they resided at Segovia, where, on the death of Henry, she was proclaimed queen of Castile and Leon (December 13, 1474). The first months of her reign were fully employed in coping with domestic disaffection and in repelling invasion from Portugal; but peace was soon secured on a basis of such firmness and permanence as rendered possible that successful policy the main features of which have already been sketched elsewhere. Spain undoubtedly owed to Isabella's clear intellect, resolute energy, and unselfish patriotism much of that greatness which for the first time it acquired under "the Catholic sovereigns." The moral influence of the queen's personal character over the Castilian court was incalculably great; from the debasement and degradation of the preceding reign she raised it to being "the nursery of virtue and of generous ambition." The very sincerity of her piety and strength of her religious convictions led her more than once, however, into great errors of state policy, which have never since been repaired, and into more than one act which offends the moral sense of a more refined age; her efforts for the introduction of the Inquisition into Castile, and for the proscription of the Jews, are outstanding evidences of what can only be called her bigotry. But not even the briefest sketch of the facts of her life can omit to notice that happy instinct or intuition which led her, when all others had heard with incredulity the scheme of Columbus, to recall the wanderer to her presence with the words "I will assume the undertaking for my own crown of Castile, and am ready to pawn my jewels to defray the expenses of it, if the funds in the treasury should be found inadequate." She died at Medina del Campo on November 24, 1504, and was succeeded by her daughter Joanna "la loca" (the "Crazy") with Ferdinand as regent. (See Prescott, *History of the Reign of Ferdinand and Isabella.*)

ISABEY, JEAN BAPTISTE, was born at Nancy on April 11, 1767. At nineteen, after some lessons from Dumont, miniature painter to Marie Antoinette, he became a pupil of David. Employed at Versailles on portraits of the dukes of Angoulême and Berry, he was given a commission by the queen, which opens the long list of those which he received, up to the date of his death in 1855, from the successive rulers of France. Patronized by Josephine and Napoleon, he arranged the ceremonies of their coronation and prepared drawings for the publication intended as its official commemoration, a work for which he was paid by Louis XVIII., whose portrait he executed in 1814. Although Isabey did homage to Napoleon on his return from Elba, he continued to enjoy the favor of the Restoration, and took part in arrangements for the coronation of Charles X. The monarchy of July conferred on him an important post in connection with the royal collections, and Napoleon III. granted him a pension, and the cross of commander of the Legion of Honor. *A Review of Troops by the First Consul* was one of his most important compositions, and *Isabey's Boat*—a charming drawing of himself and family—produced at a time when he was much occupied with lithography—had an immense success at the Salon of 1820. His portrait of Napoleon at Malmaison is held to be the best ever executed, and even his tiny head of the king of Rome, painted for a breast-pin, is distinguished by a decision and breadth which evidence the hand of a master.

ISÆUS owes his place in the decade of the Attic orators to his mastery of forensic argument; but his literary significance, in relation to the historical development of Attic prose, is not inferior to that of any other name in the series. The chronological limits of his extant work fall between the years 390-353 B. C.; and his birth may with probability be placed about 420 B.C. The Plutarchic life describes him as a Chalcidian; Suidas, whom Dionysius follows, as an Athenian. The accounts have been reconciled by supposing that his family sprang from the settlement of Athenian citizens among whom the lands of the Chalcidian hippobotæ (knights) had been divided about 509 B.C.

There is good authority for the tradition that Isæus was the pupil of Isocrates—probably about 393 B.C., when Isocrates was beginning his career as a teacher, and while Isæus was not yet occupied with his special calling. Internal evidence for such intercourse may be found in the method of handling subject-matter which some extant speeches of Isæus exhibit. Though not a pupil, Isæus had certainly been a student of Lysias. A passage of Photius has been understood as meaning that personal relations had existed between Isæus and Plato; but this view appears to rest on an erroneous construction of the passage in question.

ISAIAH. I. Isaiah is the name of the greatest, and both in life and in death the most influential of the Old Testament prophets. We do not forget Jeremiah, but Jeremiah's literary and religious influence is secondary compared with that of Isaiah. Unfortunately we are reduced to inference and conjecture with regard both to his life and to the extent of his literary activity. In the heading of what we may call the occasional prophecies of Isaiah, (*i. e.*, those which were called forth by passing events), the author is called "the son of Amoz," and Rabbinical legend identifies this Amoz with a brother of Amaziah, king of Judah; but this is evidently based on a mere etymological fancy. We know from his works that (unlike Jeremiah) he was married, and that he had at least two sons, whose names he regarded as, together with his own, symbolic by Divine appointment of certain decisive events or religious truths—Isaiah (Yesha-yāhū), meaning "Salvation—Jehovah;" Shear-Yāshūb, "a remnant shall return;" and Maher-shalal-hash-baz, "swift (swiftly cometh) spoil, speedy (speedily cometh) prey." He lived at Jerusalem, in the "middle" or "lower city," exercised at one time great influence at court, and could venture to address a king unbidden, and utter the most unpleasant truths, unassailed, in the plainest fashion. Presumably, therefore, his social rank was far above that of Amos and Micah; certainly the high degree of rhetorical skill displayed in his discourses implies a long course of literary discipline, not improbably in the school of some older prophet. We know but little of Isaiah's predecessors and models in the prophetic art; but certainly even the acknowledged prophecies of Isaiah (and much more the disputed ones) could no more have come into existence suddenly and without warning than the masterpieces of our own Shakespeare.

The same heading already referred to gives us our only traditional information as to the period during which Isaiah prophesied; it refers to Uzziah, Jotham, Ahaz, and Hezekiah as the contemporary kings. It is, however, to say the least, doubtful whether any of the extant prophecies are as early as the reign of Uzziah. Exegesis, the only safe basis of criticism for the prophetic literature, is unfavorable to the view that even chap. i. belongs to the reign of this king, and we must therefore regard it as most probable that the heading in i. 1 is (like those of the Psalms) the work of one or more of the Sopherim (or students and editors of Scripture) during the Babylonian exile, apparently the same writer (or company of writers) who prefixed the headings of Hosea and Micah, and perhaps of some of the other books.

ISAURIA, in ancient geography, was a district in the interior of Asia Minor, bounded by Mount Taurus and Cilicia on the south, by Lycaonia on the East, by Phrygia on the north, and by Pisidia on the west. Like the neighboring Lycaonia, it consisted in great part of a cold and barren upland plain, while the southern portions were rugged and mountainous. No mention is found of the Isaurians during the early periods of the history of Asia; but they were, doubtless, like their neighbors, the Pisidians, in all ages a lawless race of freebooters, owing merely a nominal allegiance to either the Persian or the Macedonian monarchy. The only occasion on which they come prominently forward in history was during the war of the Cilician and other pirates against Rome, in which they took so active a part that the proconsul, P. Servilius, deemed it necessary to follow them into their mountain fastnesses, and compelled the whole people to submission, an exploit for which he received the title of Isauricus, (75 B.C.) They were afterward placed for a time under the rule of Amyntas, king of Galatia; but it is evident that they always continued to retain their predatory habits and their virtual independence; and under the Roman empire they gave so much trouble that it was ultimately agreed to leave them in the undisturbed possession of their inaccessible mountain homes. In the fourth century they are still described by Ammianus Marcellinus as the scourge of the neighboring provinces of Asia Minor; but they are said to have been effectually subdued in the reign of Justinian.

ISCHIA, the ancient *Pithecusa*, *Ænaria*, or *Inarime*, and the mediæval *Isela*, a volcanic island of Italy, is situated at the north entrance to the Bay of Naples, about fifteen miles southwest of the Cape of Miseno. The circumference, omitting the irregular indentations of the coast-line, is about nineteen miles, and the superficial area about twenty-six square miles. Monte Epomeo or San Nicola, the ancient Epomeus or Epopeus, which rises to the height of 2,600 feet above sea-level, is the highest point. The principal summit is surrounded by twelve inferior volcanic cones, from one of which the last eruption in the island took place in 1302. The valleys between the mountains and the plain which occupies a part of the interior are remarkable for their luxuriant vegetation and beautiful scenery. The vegetable products of Ischia are very rich and various. Most of the cultivated land is occupied by vines, from which a somewhat acrid white wine is manufactured. Corn, oil, and southern fruits are produced in luxuriant profusion. Oak and chestnut groves, thickets of myrtle and lentiscus, cotton-trees, mulberries, and arbutus stretch up the mountain sides and along the pastures. Iron and sulphur are found on the island, and bricks, tiles, and pottery are manufactured at Casamicciola. The great sources of wealth to the island are the numerous thermal mineral springs, which are among the strongest and most efficacious in Europe, Casamicciola is the headquarters of the water, hot air and sand baths, but Lacco is also popular in the season. Though the nominal bathing season lasts from June to September, the exquisite climate and lovely situation of Ischia allure visitors all the year round. The island has suffered heavily from earthquakes. A very severe shock in March, 1881, occasioned great loss of life and property. The inhabitants, about 25,000 in number, are distinguished by a peculiar dialect and figure, and are chiefly engaged in tillage and fishing. The chief town is Ischia (6,500) on the east coast, the seat of a bishop, with an old castle of the fifteenth century. Other towns are Forio (6,100) on the west coast, Casamicciola and Lacco on the north, Panza and Moropano.

ISCHL, a favorite watering-place in the district of Gmunden, Upper Austria, is beautifully situated on the peninsula formed by the junction of the rivers Ischl and

Traun, and is surrounded by high mountains, presenting scenery of the finest description. It has mineral springs and numerous brine and brine-vapor baths. Ischl first came into repute in 1822, and since that time the yearly visit of the imperial family and of many of the Austrian nobility has made it one of the most fashionable and prosperous spas of Europe. In the neighborhood is a very productive salt-mine, which has been worked for more than three hundred years.

ISEGHEM, a town of Belgium in the arrondissement of Roulers and the province of West Flanders, is situated on the small river Mandel, about ten miles northeast of Courtrai. Population, 9,000.

ISÈRE, a department of southeastern France, formed from the southern part of the old province of Dauphiné, is bounded on the north by the department of Ain, east by Savoie and Hautes-Alpes, south by Hautes-Alpes and Drôme, and west by Drôme, Loire and Rhône. It is about 100 miles long from northwest to southeast and 60 miles broad from northeast to southwest. It derives its name from the river Isère, which flows through it from northeast to southwest. The Rhone, with several tributaries, is the other chief stream. Lake Paladuc is the largest of several lakes in the department. The surface is mountainous, especially in the southeast, which is occupied by lofty offshoots of the Alps, some of whose summits are covered with perpetual snow. The Belledonne, the Grandes-Rousses, the Oisans, the Grande Chartreuse, famous for its monastery, the Vercors, the Lans, and the Dévoluy are the chief groups and ranges which are found either wholly or partly within Isère. The river valleys are remarkable for their extent and fertility; that of Graisivaudan is reckoned one of the richest in France. Silkworms are reared easily and profitably; fish is exported in considerable quantity to Paris; and cheese of the department is much esteemed. There is trade in iron, steel, and other metals, cement, lime, grain, wine, liqueurs, and gloves. Isère is divided into the arrondissements of Grenoble, Vienne, La Tour-du-Pin, and Saint Marcellin, with 45 cantons and 558 communes. The chief town is Grenoble. The total area is 3,200 square miles. Pop. (1901), 563,813.

ISERLOHN, chief town of a circle in the government district of Arnsberg and province of Westphalia, Prussia, is situated on the Baar, in a bare and hilly region, seventeen miles west of Arnsburg.

ISERNIA, a town of Italy, capital of a district in the province of Campobasso, is pleasantly situated among the Apennines, fifty-four miles northeast of Naples. Population about 10,000.

ISHMAEL, "God hears," the son of Abraham by his Egyptian concubine Hagar, was born when his father was eighty-six years old, received circumcision along with Isaac when thirteen years of age, and some three or four years later (apparently in his sixteenth year) was, on account of the jealousy of Sarah, who had seen him "playing" (Hebrew), turned out of doors along with his mother. It had been foretold to his mother before his birth that he should be "a wild ass among men," and that he should dwell "before the face of" (that is to the eastward of) his brethren. It is subsequently stated that after leaving his father's roof he "grew, and became an archer, and dwelt in the wilderness of Paran, and his mother took him a wife out of the land of Egypt." It was also related that he was present at the burial of Abraham. His twelve sons are enumerated by their "villages" and "encampments" in Gen. xxv., where also their locality is indicated by the expressions that they "dwelt from Havilah unto Shur that is east of Egypt, and he settled to the eastward of his brethren," (Heb.) Of the twelve names given, only a few have historical associations apart from the Biblical records. According to the Mahometan Arabs, who recognize Ishmael as their ancestor, he lies buried with his mother in the Kaaba in Mecca.

ISHPEMING, a town in Marquette county, Michigan, whence great quantities of iron ore and pig-iron are shipped. It has grown in a few years from nothing to a population (1900) of 13,255, has several state and other banks, churches, newspapers, foundries, iron furnaces, and factories, hotels and first-class schools.

ISIDORUS HISPALENSIS, or Isidore of Seville, one of the most influential writers of the early portion of the Middle Ages, flourished during the latter part of the sixth and the early part of the seventh century. The exact date of his birth is unknown; he died 636 A.D.

ISINGLASS. See Gelatin.

ISKELIB, or Eskilup, a town in the province of Kastamuni, Asiatic Turkey, is situated near the left bank of the Kizil Irmak, at an elevation of 2,542 feet above sea-level. Population 9,000.

ISLA, José Francisco de, Spanish satirist, was born at Segovia in 1703, and became a member of the Society of Jesus, in which he distinguished himself both as a teacher and as a preacher; on the expulsion of his order from Spain in 1767 he betook himself to Bologna, where after some years of impaired health he died in 1783.

ISLÁMÁBÁD, a town in Kashmír state, Punjab, lies on the north bank of the Jhelum (Jhílam). There are large manufactures of Kashmir shawls, also of chintzes, cotton, and woolen goods.

ISLAY, an island on the west coast of Scotland, the most southern of the Hebrides group, is situated in the county of Argyll, seventeen miles west of Cantire and two miles southwest of Jura. It has an area of 220 square miles, or more than 140,000 acres, and its rental is nearly £38,000. It is the richest and most productive of the group, and on that account has been called the "Queen of the Hebrides."

ISMAIL, a town of Roumania, at the head of a district of the same name, on the left bank of the Kilia branch of the Danube, thirty miles to the east of Galatz, with a river frontage of about two and a half miles. It is the seat of a considerable trade, mainly in grain, but also in wool, leather, and tallow. Population, 25,000.

Originally a Turkish fortified post, Ismail had, by the end of the eighteenth century, grown into a place of about 30,000 inhabitants, having 4,000 dwelling-houses inside and 2,500 outside the enceinte, and numbering among its public buildings four mosques, two churches for the Moldavians, one for the Armenians, and one for the Greeks. The inhabitants were mainly Turks and Tartars, but not far from the town there was a settlement of Raskolniks, who had fled from the persecution of Peter I. Ismail was occupied by the Russians in 1770, and, twenty years later, its capture was one of the brilliant achievements of the celebrated Suwaroff. On this occasion the garrison was 40,000 strong, and the assault cost the invaders 10,000, and the defenders 30,000 men. "Never," wrote Suwaroff to Potemkin, the Russian minister, "was a fortress stronger than Ismail, and never was a defense more desperate. But Ismail is taken." The victory was the theme of one of Derzhavin's odes. In 1809 the town was again captured by the Russians; and, when, in 1812, it was assigned to them by the Bucharest peace, they chose it as the central station for the fleet of the Danube. It was about this time that the town of Tutchkoff, with which it was incorporated in 1830, grew up outside of the fortifications. These were dismantled in accordance with the treaty of Paris (1856), by which that part of Bessarabia, in which Ismail was included, was made over to Roumania.

ISMAILIA, a town of Egypt, nearly in the center of the isthmus of Suez, on the western shore of Lake Timsah (which is traversed by the canal), and connected with the railway which joins Zagazeg and, consequently, Alexandria and Cairo with Suez. It was laid out in 1863. and, for a time, had a population of about 3,000, mainly engaged in the construction of the canal. The broad macadamized streets and regular squares, bordered with trees, give it an attractive appearance; and it has besides the advantage, a rare one in Egypt, of being surrounded on three sides by flourishing gardens. The Quai Mehemet Ali, which lies along the canal for upward of a mile, contains the châlet long occupied by M. de Lesseps. At the end of the quay are the works for supplying Port Said with water; and there is a bathing establishment on Lake Timsah. Ismailia is a separate *mohafza*, or governorship, and has a vice-regal palace, and a court of first instance. The population was about 4,000 in 1900, and is now rather less.

ISMAILIA, or GONDOKORO, a famous mission-station and market-place in the territory of the Bari negroes, on the right bank of the White Nile, about 330 miles, according to Baker, above the confluence with the Bahr Giraffe, and about 200 miles below the northern end of Lake Albert Nyanza. The name Ismailia is more strictly applicable only to the military post established by Baker in 1871, and Gondokoro, as it is the more ancient, is still the more ordinary designation.

ISMID, ISKIMID, or ISNIKMID, a town of the Turkish vilayet of Khudavendikiar in Asia Minor, in the sandjak of Scutari, situated at the head of the bay of Ismid (the ancient Sinus Astacenus), an inlet of the Sea of Marmora.

ISNIK. See NICÆA.

ISOCRATES, one of the ten Attic orators, and one of the most remarkable men in the literary history of Greece, was born in 436 B.C., seven years before Plato. His father Theodorus was an Athenian citizen of the deme of Erchia—the same in which, about 431 B.C., Xenophon was born—and was sufficiently wealthy to have served the state as choregus. The fact that he possessed slaves skilled in the trade of flute-making perhaps lends point to a passage in which his son is mentioned by the comic poet Strattis. Several popular "sophists" are named as teachers of the young Isocrates. Like other sons of prosperous parents, he may have been trained in such grammatical subtleties as were taught by Protagoras or Prodicus, and initiated by Theramenes into the florid rhetoric of Gorgias, with whom at a later time (about 390 B.C.) he was in personal intercourse. He tells us that his father had been careful to provide for him the best education which Athens could afford.

Isocrates took no active part in the public life of Athens; he was not fitted, as he tells us, for the contests of the popular assembly or of the law courts. He lacked strength of voice—a fatal defect in the ecclesia, when an audience of many thousands was to be addressed in the open air; he was also deficient in "boldness." He was, in short, the physical opposite of the successful Athenian demagogue in the generation after that of Pericles; by temperament as well as taste he was more in sympathy with the sedate decorum of an older school.

It was about 392 B.C.—when he was forty-four—that he opened his school at Athens near the Lyceum, and to the end of his life he continued to teach as well as to write. In 339 B.C. he describes himself as revising the *Panathenaicus* with some of his pupils; he was then ninety-seven. The celebrity enjoyed by the school of Isocrates is strikingly attested by ancient writers. Cicero describes it as that school in which the eloquence of all Greece was trained and perfected; its disciples were "brilliant in pageant or in battle," foremost among the accomplished writers or powerful debaters of their time. Among the literary pupils of Isocrates might be named the historians Ephorus and Theopompus, the Attic archæologist Androtson, and Isocrates of Appollonia, who succeeded his master in the school. Among the practical orators we have, in the forensic kind, Isæus; in the political, Leodamas of Acharnæ, Lycurgus, and Hyperides. And these are but a few names out of many. Hermippus of Smyrna (mentioned by Athenæus) wrote a monograph on the "Disciples of Isocrates." And scanty as are now the sources for such a catalogue, a modern scholar has still been able to recover forty-one names. At the time when the school of Isocrates was in the zenith of its fame, it drew disciples, not only from the shores and islands of the Ægean, but from the cities of Sicily and the distant colonies of the Euxine. As became the image of its master's spirit, it was truly Panhellenic. When Mausssolus, prince of Caria, died in 351 B.C., his widow Artemisia instituted a contest of panegyrical eloquence in honor of his memory. The most accomplished rhetoricians of Greece entered the lists at Halicarnassus; but among all the competitors there was not one—if tradition may be trusted—who had not been the pupil of Isocrates.

ISOMERISM. See CHEMISTRY.

ISOTHERMS. See METEOROLOGY.

ISPAHÁN, or ISFAHÁN, a city of Persia, in the province of Irak Adjemi, enjoys the reputation of a very salubrious climate, except in the autumn, when fevers are prevalent. The city walls—a mere mud curtain ruined in many places—are about five miles in circumference. There are some 300 villages, more or less flourishing, in the neighborhood. In the interior of the city there are reckoned to be sixty mosques (of which about forty are in use), from eighty to a hundred baths, perhaps fifty colleges (which seems, however, far beyond the wants of the population), and twenty caravanserais in a more or less perfect state.

The public buildings of Ispahán (the best specimens of modern Oriental design and decoration to be found in Persia, or perhaps anywhere in the East) are of two distinct classes—those constructed by Shah Abbas and his successors, and those erected during the present Kajar dynasty. The two great palaces of Shah Abbas the Great are named respectively Chihil-Sutún ("the forty pillars") and Hasht Bihisht ("the eight paradises"). They are surrounded by extensive gardens, traversed by avenues of planes and poplars, and intersected by paved canals of running water, with fountains and reservoirs sparkling in all directions, the whole area being encompassed by a mud wall which is nearly three miles in circumference. Perhaps the most agreeable residence of all is the Haft Dast ("seven courts") in the beautiful garden of Sa'adetabád, on the southern bank of the river, and two or three miles from the heart of the city. This palace was built by Shah Tahmasp, the successor of Shah Abbas, and until lately was kept in good repair and used as a villa residence by the prince governor.

Among the other notable buildings of Ispahán must be reckoned its colleges and bridges. The Zindeh-rúd or "river of life" rises in Zardehkoh, about ninety miles to the west of Ispahán, where some stupendous tunneling works are yet to be seen, the traces of Shah Abbas' abortive attempt to turn the Karún or Shuster stream into the eastern river bed. It flows in a well-cultivated valley through the districts of Chár-mehel and Liuján to the town of Ispahán, passing along the southern outskirts of the city from west to east, and being crossed by three principal bridges. The first, the Púl-i-Chár-bágh, or, as it is also called, the Pul-i-Julfa, connecting the suburb of Julfa to the south with the stately Chár-bágh avenue to the north, consists of a double row of thirty-four arches, with covered galleries on both sides, and with a roadway, battlemented and paved throughout. The second bridge, the Púl-i-Khajú, is on the high road to the south, and is thus much frequented. It is also built with great solidity on a double row of arches, and is kept in excellent repair. The third bridge is smaller and less used.

Of the colleges of Ispahán, which are said to be fifty in number, and the greater part of which are still used as educational establishments for the Mahometan priesthood, the most remarkable building is the Medresseh Shah Sultán Hussain, on the right of the avenue leading northward from the Púl-i-Khajú.

Another striking feature of Ispahán is the line of covered bazaars, commencing with the Hassanabád and ending with the Kaiseríeh, which extends for nearly three miles, and divides the city from south to north. The confluence of people in these bazaars is certainly very great, and gives an exaggerated idea of the populousness of the city, the truth being that while the inhabitants congregate for business in these streets, the rest of the city is comparatively deserted.

But although Ispahán thus abounds with traces of former grandeur and magnificence, although even now, when surveyed from a commanding height within the city, or in the immediate environs, the enormous extent of mingled garden and building, at least thirty miles in circumference, gives an impression of populousness and busy life, a closer scrutiny reveals that the whole scene is nothing more than a gigantic sham. With the exception of the bazaars and a few scattered hamlets, there is really no continuous inhabited area. Whole streets, whole quarters of the city have fallen into utter ruin, and are absolutely deserted, the traveler who is bent on visiting some of the remarkable sites in the northwestern or northeastern suburbs, such as the ruins of the old fire temple, the remains of the famous castle of Tabarrak, or the shaking minarets of Guladán, having to pass through miles of crumbling mud walls and roofless houses. It is believed indeed that not a twentieth part of the area of the old city is at present peopled, and that the million of inhabitants, reported at the time of Chardin, have now (1902) dwindled to about 80,000 souls.

ISRAEL. According to the Book of Genesis, Israel was the brother of Edom, and the cousin of Moab and Ammon. These four petty peoples, which may be classed together as the Hebrew group, must at one time have formed some sort of a unity and have passed through a common history which resulted in their settlement in southeastern Palestine. The Israelites, or rather that section of the Hebrew group which afterward developed into Israel, appear at first to have been the immediate neighbors of Edom, and to have extended westward toward the border of Egypt. As regards the ethnological position of the Hebrews as a whole, tradition has it that they had connections not only with the Aramæans of Orshoene (Nahor), but also with certain of the old half-Arab inhabitants of the Sinaitic peninsula (Kenites, Amalek, Midian). To the Canaanites, whose language they had adopted, their relation was that of foreign conquerors and lords to a subject race. Some fifteen centuries before our era a section of the Hebrew group left its ancient seat in the extreme south of Palestine to occupy the not distant pasture lands of Egypt (Goshen), where they carried on their old calling, that of shepherds and goatherds. Although settled within the territory of the Pharaohs, and recognizing their authority, they continued to retain all their old characteristics—their language, their patriarchal institutions, their nomad habits of life.

We append the Bible account of the exodus, and offer the explanation of the story given by Professor Wellhausen (evidently written from a materialistic standpoint) for what it may be worth, making no comment either for or against the probabilities of either version being the correct one, preferring to leave a selection to the religious tastes and beliefs of our readers.

And the Lord said unto Moses, See, I have made thee a god to Pharaoh: and Aaron thy brother shall be thy prophet.

Thou shalt speak all that I command thee: and Aaron thy brother shall speak unto Pharaoh, that he send the children of Israel out of his land.

* * * * * * * * *

¶ And the Lord spake unto Moses and unto Aaron, saying,

When Pharaoh shall speak unto you, saying, Shew a miracle for you: then thou shalt say unto Aaron, Take thy rod, and cast *it* before Pharaoh, *and* it shall become a serpent.

¶ And Moses and Aaron went in unto Pharaoh, and they did so as the Lord had commanded: and Aaron cast down his rod before Pharaoh, and before his servants, and it became a serpent.

Then Pharaoh also called the wise men and the sorcerers: now the magicians of Egypt, they also did in like manner with their enchantments.

For they cast down every man his rod, and they became serpents: but Aaron's rod swallowed up their rods.

And he hardened Pharaoh's heart, that he hearkened not unto them; as the Lord had said.

¶ And the Lord said unto Moses, Pharaoh's heart *is* hardened, he refuseth to let the people go.

Get thee unto Pharaoh in the morning; lo, he goeth out unto the water; and thou shalt stand by the river's brink against he come; and the rod which was turned to a serpent shalt thou take in thine hand.

And thou shalt say unto him, The Lord God of the Hebrews hath sent me unto thee, saying, Let my people go, that they may serve me in the wilderness: and, behold, hitherto thou wouldest not hear.

Thus saith the Lord, In this thou shalt know that I *am* the Lord: behold, I will smite with the rod that *is* in mine hand upon the waters which *are* in the river, and they shall be turned to blood.

And the fish that *is* in the river shall die, and the river shall stink; and the Egyptians shall loathe to drink of the water of the river.

¶ And the Lord spake unto Moses, Say unto Aaron, Take thy rod, and stretch out thine hand upon the waters of Egypt, upon their streams, upon their rivers, and upon their ponds, and upon all their pools of water, that they may become blood; and *that* there may be blood throughout all the land of Egypt, both in *vessels of* wood, and in *vessels of* stone.

And Moses and Aaron did so, as the Lord commanded; and he lifted up the rod, and smote the waters that *were* in the river, in the sight of Pharaoh, and in the sight of his servants; and all the waters that *were* in the river were turned to blood.

And the fish that *was* in the river died; and the river stank, and the Egyptians could not drink of the water of the river; and there was blood throughout all the land of Egypt.

And the magicians of Egypt did so with their enchantments: and Pharaoh's heart was hardened, neither did he hearken unto them; as the Lord had said.

And Pharaoh turned and went into his house, neither did he set his heart to this also.

And all the Egyptians digged round about the river for water to drink; for they could not drink of the water of the river.

And seven days were fulfilled, after that the Lord had smitten the river.

¶ And the Lord spake unto Moses, Go unto Pharaoh, and say unto him, Thus saith the Lord, Let my people go, that they may serve me.

And if thou refuse to let *them* go, behold, I will smite all thy borders with frogs:

And the river shall bring forth frogs abundantly, which shall go up and come into thine house, and into thy bedchamber, and upon thy bed, and into the house of thy servants, and upon thy people, and into thine ovens, and into thy kneading-troughs:

And the frogs shall come up both on thee, and upon thy people, and upon all thy servants.

¶ And the Lord spake unto Moses, Say unto Aaron, Stretch forth thine hand with thy rod over the streams, over the rivers, and over the ponds, and cause frogs to come up upon the land of Egypt.

And Aaron stretched out his hand over the waters of Egypt; and the frogs came up and covered the land of Egypt.

And the magicians did so with their enchantments, and brought up frogs upon the land of Egypt.

¶ Then Pharaoh called for Moses and Aaron, and said, Intreat the LORD, that he may take away the frogs from me, and from my people; and I will let the people go, that they may do sacrifice unto the LORD.

And Moses said unto Pharaoh, Glory over me: when shall I intreat for thee, and for thy servants, and for thy people, to destroy the frogs from thee and thy houses, *that* they may remain in the river only?

And he said, To-morrow. And he said, *Be it* according to thy word: that thou mayest know that *there is* none like unto the LORD our God.

And the frogs shall depart from thee, and from thy houses, and from thy servants, and from thy people; they shall remain in the river only.

And Moses and Aaron went out from Pharaoh: and Moses cried unto the LORD because of the frogs which he had brought against Pharaoh.

And the LORD did according to the word of Moses; and the frogs died out of the houses, out of the villages, and out of the fields.

And they gathered them together upon heaps: and the land stank.

But when Pharaoh saw that there was respite, he hardened his heart, and hearkened not unto them; as the LORD had said.

¶ And the LORD said unto Moses, Say unto Aaron, Stretch out thy rod, and smite the dust of the land, that it may become lice throughout all the land of Egypt.

And they did so; for Aaron stretched out his hand with his rod, and smote the dust of the earth, and it became lice in man, and in beast; all the dust of the land became lice throughout all the land of Egypt.

And the magicians did so with their enchantments to bring forth lice, but they could not: so there were lice upon man and upon beast.

Then the magicians said unto Pharaoh, This *is* the finger of God: and Pharaoh's heart was hardened, and he hearkened not unto them; as the LORD had said.

¶ And the LORD said unto Moses, Rise up early in the morning, and stand before Pharaoh; lo, he cometh forth to the water; and say unto him, Thus saith the LORD, Let my people go, that they may serve me.

Else, if thou wilt not let my people go, behold, I will send swarms of *flies* upon thee, and upon thy servants, and upon thy people, and into thy houses: and the houses of the Egyptians shall be full of swarms of *flies*, and also the ground whereon they *are*.

And I will sever in that day the land of Goshen, in which my people dwell, that no swarms of *flies* shall be there; to the end thou mayest know that I *am* the LORD in the midst of the earth.

And I will put a division between my people and thy people: to-morrow shall this sign be.

And the LORD did so; and there came a grievous swarm of *flies* into the house of Pharaoh, and *into* his servants' houses, and into all the land of Egypt: the land was corrupted by reason of the swarm of *flies*.

¶ And Pharaoh called for Moses and for Aaron, and said, Go ye, sacrifice to your God in the land.

And Moses said, It is not meet so to do; for we shall sacrifice the abomination of the Egyptians to the LORD our God: lo, shall we sacrifice the abomination of the Egyptians before their eyes, and will they not stone us?

We will go three days' journey into the wilderness, and sacrifice to the LORD our God, as he shall command us.

And Pharaoh said, I will let you go, that ye may sacrifice to the LORD your God in the wilderness: only ye shall not go very far away: intreat for me.

And Moses said, Behold, I go out from thee, and I will intreat the LORD that the swarms *of flies* may depart from Pharaoh, from his servants, and from his people, to-morrow: but let not Pharaoh deal deceitfully any more in not letting the people go to sacrifice to the LORD.

And Moses went out from Pharaoh, and intreated the LORD.

And the LORD did according to the word of Moses; and he removed the swarms *of flies* from Pharaoh, from his servants, and from his people; there remained not one.

And Pharaoh hardened his heart at this time also, neither would he let the people go.

¶ Then the LORD said unto Moses, Go in unto Pharaoh, and tell him, Thus saith the LORD God of the Hebrews, Let my people go, that they may serve me.

For if thou refuse to let *them* go, and wilt hold them still,

Behold, the hand of the LORD is upon thy cattle which *is* in the field, upon the horses, upon the asses, upon the camels, upon the oxen, and upon the sheep; *there shall be* a very grievous murrain.

And the LORD shall sever between the cattle of Israel and the cattle of Egypt: and there shall nothing die of all *that is* the children's of Israel.

And the LORD appointed a set time, saying, To-morrow the LORD shall do this thing in the land.

And the LORD did that thing on the morrow, and all the cattle of Egypt died; but of the cattle of the children of Israel died not one.

And Pharaoh sent, and, behold, there was not one of the cattle of the Israelites dead. And the heart of Pharaoh was hardened, and he did not let the people go.

¶ And the LORD said unto Moses and unto Aaron, Take to you handfuls of ashes of the furnace, and let Moses sprinkle it toward the heaven in the sight of Pharaoh.

And it shall become small dust in all the land of Egypt, and shall be a boil breaking forth *with* blains upon man, and upon beast, throughout all the land of Egypt.

And they took ashes of the furnace, and stood before Pharaoh; and Moses sprinkled it up toward heaven; and it became a boil breaking forth *with* blains upon man, and upon beast.

And the magicians could not stand before Moses because of the boils; for the boil was upon the magicians, and upon all the Egyptians.

And the LORD hardened the heart of Pharaoh, and he hearkened not unto them; as the LORD had spoken unto Moses.

¶ And the LORD said unto Moses, Rise up early in the morning, and stand before Pharaoh, and say unto him, Thus saith the LORD God of the Hebrews, Let my people go, that they may serve me.

For I will at this time send all my plagues upon thine heart, and upon thy servants, and upon thy people; that thou mayest know that *there is* none like me in all the earth.

For now I will stretch out my hand, that I may smite thee and thy people with pestilence; and thou shalt be cut off from the earth.

And in very deed for this *cause* have I raised thee up, for to shew *in* thee my power; and that my name may be declared throughout all the earth.

As yet exaltest thou thyself against my people, that thou wilt not let them go?

Behold to-morrow about this time I will cause it to rain a very grievous hail, such as hath not been in Egypt since the foundation thereof even until now.

Send therefore now, *and* gather thy cattle, and all that thou hast in the field; *for upon* every man and beast which shall be found in the field, and shall not be brought home, the hail shall come down upon them, and they shall die.

He that feared the word of the LORD among the servants of Pharaoh made his servants and his cattle flee into the houses:

And he that regarded not the word of the LORD left his servants and his cattle in the field.

¶ And the LORD said unto Moses, Stretch forth thine hand toward heaven, that there may be hail in all the land of Egypt, upon man, and upon beast, and upon every herb of the field, throughout the land of Egypt.

And Moses stretched forth his rod toward heaven: and the LORD sent thunder and hail, and the fire ran along upon the ground; and the LORD rained hail upon the land of Egypt.

So there was hail, and fire mingled with the hail, very grievous, such as there was none like it in all the land of Egypt since it became a nation.

And the hail smote throughout all the land of Egypt all that *was* in the field, both man and beast; and the hail smote every herb of the field, and brake every tree of the field.

Only in the land of Goshen, where the children of Israel *were*, was there no hail.

¶ And Pharaoh sent, and called for Moses and Aaron, and said unto them, I have sinned this time: the LORD *is* righteous, and I and my people *are* wicked.

Intreat the LORD (for *it is* enough) that there be no *more* mighty thunderings and hail; and I will let you go, and ye shall stay no longer.

And Moses said unto him, As soon as I am gone out of the city I will spread abroad my hands unto the LORD; *and* the thunder shall cease, neither shall there be any more hail; that thou mayest know how that the earth *is* the LORD's.

But as for thee and thy servants, I know that ye will not yet fear the LORD God.

And the flax and the barley was smitten; for the barley *was* in the ear, and the flax *was* bolled.

But the wheat and the rye were not smitten; for they *were* not grown up.

And Moses went out of the city from Pharaoh, and spread abroad his hands unto the LORD: and the thunders and hail ceased, and the rain was not poured upon the earth.

And when Pharaoh saw that the rain and the hail and the thunders were ceased, he sinned yet more, and hardened his heart, he and his servants.

And the heart of Pharaoh was hardened, neither would he let the children of Israel go; as the LORD had spoken by Moses.

¶ And the LORD said unto Moses, Go in unto Pharaoh: for I have hardened his heart, and the heart of his servants, that I might shew these my signs before him:

And that thou mayest tell in the ears of thy son, and thy son's son, what things I have wrought in Egypt, and my signs which I have done among them; that ye may know how that I *am* the LORD.

And Moses and Aaron came in unto Pharaoh, and said unto him, Thus saith the LORD God of the Hebrews, How long wilt thou refuse to humble thyself before me? let my people go, that they may serve me.

Else, if thou refuse to let my people go, behold, to-morrow will I bring the locusts into thy coast:

And they shall cover the face of the earth, that one cannot be able to see the earth: and that they shall eat the residue of that which is escaped, which remaineth unto you from the hail, and shall eat every tree which groweth for you out of the field:

And they shall fill thy houses, and the houses of all thy servants, and the houses of all the Egyptians; which neither thy father's nor thy father's fathers have seen, since the day that they were upon the earth unto this day. And he turned himself and went out from Pharaoh.

And Pharaoh's servants said unto him, How long shall this man be a snare unto us? let the men go, that they may serve the LORD their God: knowest thou not yet that Egypt is destroyed?

And Moses and Aaron were brought again unto Pharaoh: and he said unto them, Go serve the LORD your God: *but* who *are* they that shall go?

And Moses said, We will go with our young and with our old, with our sons and with our daughters, with our flocks and with our herds will we go; for we *must hold* a feast unto the Lord.

And he said unto them, Let the LORD be so with you, as I will let you go, and your little ones: look *to it;* for evil *is* before you.

Not so: go now ye *that are* men, and serve the LORD; for that ye did desire. And they were driven out from Pharaoh's presence.

¶ And the LORD said unto Moses, Stretch out thine hand over the land of Egypt for the locusts, that they may come up upon the land of Egypt, and eat every herb of the land, *even* all that the hail hath left.

And Moses stretched forth his rod over the land of Egypt, and the LORD brought an east wind upon the land all that day, and all *that* night; *and* when it was morning, the east wind brought the locusts.

And the locusts went up over all the land of Egypt, and rested in all the coasts of Egypt: very grievous *were they;* before them there were no such locusts as they, neither after them shall be such.

For they covered the face of the whole earth, so that the land was darkened; and they did eat every herb of the land, and all the fruit of the trees which the hail had left: and there remained not any green thing in the trees, or in the herbs of the field, through all the land of Egypt.

¶ Then Pharaoh called for Moses and Aaron in haste; and he said, I have sinned against the LORD your God, and against you.

Now therefore forgive, I pray thee, my sin only this once, and intreat the LORD your God, that he may take away from me this death only.

And he went out from Pharaoh, and intreated the LORD.

And the LORD turned a mighty strong west wind, which took away the locusts, and cast them into the Red Sea; there remained not one locust in all the coasts of Egypt.

But the LORD hardened Pharaoh's heart, so that he would not let the children of Israel go.

¶ And the LORD said unto Moses, Stretch out thine hand toward heaven, that there may be darkness over the land of Egypt, even darkness *which* may be felt.

And Moses stretched forth his hand toward heaven; and there was a thick darkness in all the land of Egypt three days:

They saw not one another, neither rose any from his place for three days: but all the children of Israel had light in their dwellings.

¶ And Pharaoh called unto Moses, and said, Go ye, serve the LORD; only let your flocks and your herds be stayed: let your little ones also go with you.

And Moses said, Thou must give us also sacrifices and burnt offerings, that we may sacrifice unto the LORD our God.

Our cattle shall also go with us; there shall not an hoof be left behind; for thereof must we take to serve the LORD our God; and we know not with what we must serve the LORD, until we come thither.

¶ But the LORD hardened Pharaoh's heart, and he would not let them go.

And Pharaoh said unto him, Get thee from me, take heed to thyself, see my face no more; for in *that* day thou seest my face thou shalt die.

And Moses said, Thou hast spoken well, I will see thy face again no more.

¶ And the LORD said unto Moses, Yet will I bring one plague *more* upon Pharaoh, and upon Egypt; afterward he will let you go hence: when he shall let *you* go, he shall surely thrust you out hence altogether.

Speak now in the ears of the people, and let every man borrow of his neighbor, and every woman of her neighbor, jewels of silver, and jewels of gold

And the LORD gave the people favor in the sight of the Egyptians. Moreover the man Moses *was* very great in the land of Egypt, in the sight of Pharaoh's servants, and in the sight of the people.

* * * * * * * * *

¶ And it came to pass, that at midnight the LORD smote all the firstborn in the land of Egypt, from the firstborn of Pharaoh that sat on his throne unto the firstborn of the captive that *was* in the dungeon; and all the firstborn of cattle.

And Pharaoh rose up in the night, he, and all his servants, and all the Egyptians; and there was a great cry in Egypt; for *there was* not a house where *there was* not one dead.

¶ And he called for Moses and Aaron by night, and said, Rise up, *and* get you forth from among my people, both ye and the children of Israel; and go, serve the LORD, as ye have said.

Also take your flocks and your herds, as ye have said, and be gone; and bless me also.

And the Egyptians were urgent upon the people, that they might send them out of the land in haste; for they said, We *be* all dead *men*.

And the people took their dough before it was leavened, their kneading-troughs being bound up in their clothes upon their shoulders.

And the children of Israel did according to the word of Moses; and they borrowed of the Egyptians jewels of silver, and jewels of gold, and raiment:

And the LORD gave the people favor in the sight of the Egyptians, so that they lent unto them *such things as they required*. And they spoiled the Egyptians.

¶ And the children of Israel journeyed from Rameses to Succoth, about six hundred thousand on foot *that were* men, beside children.

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¶ Now the sojourning of the children of Israel, who dwelt in Egypt, *was* four hundred and thirty years.

And it came to pass at the end of the four hundred and thirty years, even the self-same day it came to pass, that all the hosts of the LORD went out from the land of Egypt.

Professor Wellhausen says: In the course of time these foreign guests were subjected to changed treatment. Forced labor was exacted of them for the construction of new public works in Goshen, an exaction which was felt to be an assault upon their freedom and honor, and which in point of fact was fitted to take away all that was distinctive of their nationality. But they had no remedy at hand, and had submitted in despair, until Moses at last saw a favorable opportunity of deliverance. Reminding his oppressed brethren of the God of their fathers, and urging that their cause was His, he taught them to regard self-assertion against the Egyptians as an article of religion; and they became once more a united people in a determination to seek refuge from oppression in the wilderness which was the dwelling place of their kindred and the seat of their God. At a time when Egypt was scourged by a grievous plague, the Hebrews broke up their settlement in Goshen one night in spring, and directed their steps toward their old home again. According to the accounts, the king had consented to the exodus, and latterly had even forced it on, but it was none the less a secret flight.

To a not very numerous pastoral people such an undertaking presented no great difficulty. Nevertheless its execution was not to be carried out unimpeded. The Hebrews, compelled to abandon the direct eastward road (Exod. xiii. 17, 18), turned toward the southwest and encamped at last on the Egyptian shore of the northern arm of the Red Sea, where they were overtaken by Pharaoh's army. The situation was a critical one; but a high wind during the night had left the shallow sea so low that it became possible to ford it. Moses eagerly accepted the suggestion, and made the venture with success. The Egyptians, rushing after, came up with them on the further shore, and a struggle ensued. But the assailants fought at a disadvantage, the ground being ill suited for their chariots and horsemen; they fell into confusion and attempted a retreat. Meanwhile the wind had changed; the waters returned, and the pursuers were annihilated.

After turning aside to visit Sinai as related in Exodus, the emigrants settled at Kadesh, eastward from Goshen, on the southern borders of Palestine, where they remained for many years, having at the well of Kadesh their sanctuary and judgment seat only; while with their flocks they ranged over an extensive tract. In all probability their stay at Kadesh was no involuntary detention; rather was it this locality they had more immediately had in view in setting out. For a civilized community of from 2,000,000 to 3,000,000 such a settlement would of course have been impossible; but it was quite sufficient for the immediate requirements of the Goshen shepherds, few in number as they were, and inured to the life of the desert. That attempts may have been made by them to obtain possession of the more fertile country to the north is very likely; but that from the outset they contemplated the conquest of the whole of Palestine proper, and that it was only in expiation of a fault that they were held back at the gate of the promised land until the whole generation of the disobedient had died out, is not historically probable.

We can assign a definite reason for their final departure from Kadesh. In the district to the east of Jordan the (Canaanite) Amorites had, some time previously, driven the Ammonites from the lower Jabbok and deprived the Moabites of all their territory to the north of the Arnon; on the plateau opposite Jericho Heshbon had become the capital of Sihon, the Amorite king. This sovereign now set himself to subdue southern Moab also, and not without success. From these straits the Moabites were rescued by their cousins, the nomads of the wilderness of Kadesh. The Israelites came forward on behalf of what was at once the common Hebrew cause and their own particular interest; they took the field against the Amorites, vanquished them in battle, and broke up the kingdom of Sihon. The consequence was that the land to the south of the Arnon remained in the undisputed possession of Moab, while the victors themselves became masters of the territory immediately to the north. Settled thus between Moab and Ammon their kinsmen, the Israelites supplied the link that was wanting in the chain of petty Hebrew nationalities established in the south of eastern Palestine.

The time of Moses is invariably regarded as the properly creative period in Israel's history, and on that account also as giving the pattern and norm for the ages which followed. In point of fact the history of Israel must be held to have begun then, and the foundations of a new epoch to have been laid. The prophets who came after gave, it is true, greater distinctness to the peculiar character of the nation, but they did not make it; on the contrary, it made them. Again, it is true that the movement which resulted in the establishment of the monarchy brought together for the first time into organic unity the elements which previously had existed only in an isolated condition; but Israel's sense of national personality was a thing of much earlier origin, which even in the time of the judges bound the various tribes and families together, and must have had a great hold on the mind of the nation, although there was no formal and binding constitution to give it support. When the Israelites settled in Palestine they found it inhabited by a population superior to themselves both in numbers and in civilization, which they did not extirpate, but on the contrary gradually subdued and absorbed. The process was favored by affinity of race and similarity of speech; but, however far it went, it never had the effect of making Israelites Canaanites; on the contrary, it made Canaanites Israelites. Notwithstanding their inferiority, numerical and otherwise, they maintained their individuality, and that without the support of any external organization. Thus a certain inner unity actually subsisted long before it had found any outward political expression; it goes back to the time of Moses, who is to be regarded as its author.

The foundation upon which, at all periods, Israel's sense of its national unity rested was religious in its character. It was the faith which may be summed up in the formula, Jehovah is the God of Israel, and Israel is the people of Jehovah. Moses was not the first discoverer of this faith, but it was through him that it came to be the fundamental basis of the national existence and history. The exigencies of their position severed a number of kindred clans from their customary surroundings, and drove them into his arms. He undertook the responsibilities of their leader, and the confidence of success which he manifested was justified by the result. But it was not through any merit of his that the undertaking (of which he was the soul) prospered as it did; his design was aided in a wholly unlooked-for way, by a marvelous occurrence quite beyond his control, and which no sagacity could possibly have foreseen. One whom the wind and sea obeyed had given him His aid. Behind him stood one higher than he, whose spirit wrought in him and whose arm wrought for him—not for his personal aggrandizement indeed, but for the weal of the nation. It was Jehovah. Alike what was done by the deliberate purpose of Moses and what was done without any human contrivance by nature and by accident came to be regarded in one great totality as the doing of Jehovah for Israel. Jehovah it was who had directed each step in that process through which these so diverse elements, brought together by the pressure of necessity, had been caused to pass, and in the course of which the first beginnings of a feeling of national unity had been made to grow.

This feeling Moses was the first to elicit; he it was also who maintained it in life and cherished its growth. The extraordinary set of circumstances which had first occasioned the new national movement continued to subsist, though in a less degree, throughout the sojourn of the people in the wilderness, and it was under their pressure that Israel continued to be molded. To Moses, who had been the means of so brilliantly helping out of their first straits the Hebrews who had accompanied him out of Egypt, they naturally turned in all subsequent difficulties; before him they brought all affairs with which they were not themselves able to cope. The authority which his antecedents had secured for him made him as matter of course the great national "Kadhi" in the wilderness. Equally as matter of course did he exercise his judicial functions, neither in his own interest nor in his own name, but in the interest of the whole community and in the name of Jehovah. By connecting them with the sanctuary of Jehovah, which stood at the well of Kadesh, he made these functions independent of his person, and thus he laid a firm basis for a consuetudinary law and became the originator of the Torah in Israel. In doing this he succeeded in inspiring the national being with that which was the very life of his own soul; through the Torah he gave a definite, positive expression to their sense of nationality and their idea of God. Jehovah was not merely the God of Israel; as such He was the God at once of law and of justice, the basis, the informing principle, and the implied postulate of their national consciousness.

The relationship was carried on in precisely the same manner as that in which it had been begun. It was most especially in the graver moments of its history that Israel awoke to full consciousness of itself and of Jehovah. Now, at that time, and for centuries afterward, the high-water marks of history were indicated by the wars it recorded. The name "Israel" means "El does battle," and Jehovah was the warrior El, after whom the nation styled itself. The camp was, so to speak, at once the cradle in which the nation was nursed and the smithy in which it was welded into unity; it was also the primitive sanctuary. There Israel was, and there was Jehovah. If in times of peace the relations between the two had become dormant, they were at once called forth into fullest activity when the alarm of danger was raised; Israel's awakening was always preceded by the awakening of Jehovah. Jehovah awakened men who, under the guidance of His spirit, placed themselves at the nation's head; in them His proper leadership was visibly expressed. Jehovah went forth with the host to battle, and in its enthusiasm His presence was seen. With signs and wonders from heaven Jehovah decided the struggle carried on upon earth. In it He was always upon Israel's side; on Israel was His whole interest concentrated, although His power (for He was God) reached far beyond their local limits.

Thus Jehovah was in a very real sense a living God; but the manifestations of His life in the great crises of His people's history were of necessity separated by considerable intervals of time. His activity had something abrupt and tumultuary about it, better suited for extraordinary occasions than for ordinary daily life. Traces of this feeling appear very prominently in the later stages of the development. But although the relations between Israel and Israel's God came most strongly into prominence in times of excitement, yet it did not altogether die out in the periods of comparative repose. It was in the case of Jehovah just as in the case of the human leaders of the people, who did not in times of peace wholly lose the influence they had gained in war. Jehovah had his permanent court at the places of worship where in times of quietude men clung to Him that they might not lose Him in times of trouble. His chief—perhaps in the time of Moses His only—sanctuary was with the so-called ark of the covenant. It was a standard, adapted primarily to the requirements of a wandering and warlike life; brought back from the field, it became, as symbol of Jehovah's presence, the central seat of His worship. The cultus itself was more than a mere paying of court to Jehovah, more than a mere expedient for retaining His sympathies against times of necessity; the Torah of Jehovah, the holy administration of law, was conjoined with it. This had, first of all, been exercised, at the instance of the priest of Midian, by Moses at the well of Kadesh; it was continued after him, at the sanctuary, within the circle of those who had attached themselves to him and were spiritually his heirs. In cases where the wisdom or the competency of the ordinary judges failed, men turned direct to the Godhead, *i. e.*, to the sanctuary and those who served it. Their decisions, whether given according to their own lights or by lot (according to the character of the question), were not derived from any law, but were received direct from Jehovah. The execution of their decisions did not lie with them; they could only advise and teach. Their authority was divine, or, as we should say, moral, in its character; it rested upon that spontaneous recognition of the idea of right which, though unexpressed, was alive and working among the tribes, upon Jehovah Himself, who was the author of this generally diffused sense of right, but revealed the proper determinations on points of detail only to certain individuals. The priestly Torah was an entirely unpolitical, or rather prepolitical institution; it had an existence before the state had, and it was one of the invisible foundation pillars on which the state rested.

War and the administration of justice were regarded as matters of religion before they became matters of obligation and civil order: this is all that is really meant when a theocracy is spoken of. Moses certainly organized no formal state, endowed with specific holiness, upon the basis of the proposition "Jehovah is the God of Israel;" or, at all events, if he did so, the fact had not in the slightest degree any practical consequences or historical significance. The old patriarchal system of families and clans continued as before to be the ordinary constitution, if one can apply such a word as constitution at all to an unorganized conglomeration of homogeneous elements. What there was of permanent official authority lay in the hands of the elders and heads of houses; in time of war they commanded each his own household force, and in peace they dispensed justice each within his own circle. But this obviously imperfect and inefficient form of government showed a growing tendency to break down just in proportion to the magnitude of the tasks which the nation in the course of its history was called upon to undertake. Appeal to Jehovah was always in these circumstances resorted to; His court was properly that of last resort, but the ordinary authorities were so inadequate that it had often enough to be applied to. Theocracy, if one may so say, arose as the complement of anarchy. Actual and legal existence (in the modern sense) was predicable only of each of the many clans; the unity of the nation was realized in the first instance only through its religion. It was out of the religion of Israel that the commonwealth of Israel unfolded itself—not a *holy* state, but *the* state. And the state continued to be, consciously, rooted in religion, which prevented it from quitting or losing its rapport with the soil from which it had originally sprung. With the intermediate and higher stages of political organization, with the building of the upper structure, however, religion had no concern, they were too far removed from the foundation. The derivative, which did not carry immediately in itself its own title to exist, was a matter of indifference to it; what had come into being it suffered to go its own way as soon as it was capable of asserting its independence. For this reason it always turned by preference to the future, not in a utopian but in a thoroughly practical way; by a single step only did it keep ahead of the present. It prepared the way for such developments as are not derived from existing institutions, but spring immediately from the depths in which human society has its secret and mysterious roots.

The expression "Jehovah is the God of Israel," accordingly, meant that every task of the nation, internal as well as external, was conceived as holy. It certainly did not mean that the almighty Creator of heaven and earth was conceived of as having first made a covenant with this one people that by them He might be truly known and worshiped. It was not as if Jehovah had originally been regarded as the God of the universe who subsequently became the God of Israel; on the contrary, He was primarily Israel's God, and only afterward (very long afterward) did He come to be regarded as the God of the universe. For Moses to have given to the Israelites an "enlightened conception of God" would have been to have given them a stone instead of bread; it is in the highest degree probable that, with regard to the essential nature of Jehovah, as distinct from His relation to men, he allowed them to continue in the same way of thinking with their fathers. With theoretical truths, which were not at all in demand, he did not occupy himself, but purely with practical questions which were put and urged by the pressure of the times. The religious starting-point of the history of Israel was remarkable, not for its novelty, but for its normal character. In all ancient primitive peoples the relation in which God is conceived to stand to the circumstances of the nation—in other words, religion—furnishes a motive for law and morals; in the case of none did it become so with such purity and power as in that of the Israelites. Whatever Jehovah may have been conceived to be in His essential nature—God of the thunderstorm or the like—this fell more and more into the background as mysterious and transcendental; the subject was not one for inquiry. All stress was laid upon His activity within the world of mankind, whose ends He made one with His own. Religion thus did not make men partakers in a divine life, but contrariwise it made God a partaker in the life of men; life in this way was not straightened by it, but enlarged. The so-called "particularism" of Israel's idea of God was in fact the real strength of Israel's religion; it thus escaped from barren mythologizings, and became free to apply itself to the moral tasks which are always given, and admit of being discharged, only in definite spheres. As God of the nation, Jehovah became the God of justice and of right; as God of justice and right, He came to be thought of as the highest, and at last as the only, power in heaven and earth.

The kingdom of Sihon did not permanently suffice the Israelites, and the disintegration of the Canaanites to the west of Jordan in an endless number of kingdoms and cities invited attack. The first essay was made by Judah in conjunction with Simeon and Levi, but was far from prosperous. Simeon and Levi were annihilated; Judah, also, though successful in mastering the mountain land to the west of the Dead Sea, was so only at the cost of severe losses which were not again made up until the accession of the Kenite families of the south (Caleb). As a consequence of the secession of these tribes, a new division of the nation into Israel and Judah took the place of that which had previously subsisted between the families of Leah and Rachel; under Israel were included all the tribes except Simeon, Levi and Judah, which three are no longer mentioned in Judges v., where all the others are carefully and exhaustively enumerated. This half-abortive first invasion of the west was followed by a second, which was stronger and attended with much better results. It was led by the tribe of Joseph, to which the others attached themselves, Reuben and Gad only remaining behind in the old settlements. The district to the north of Judah, inhabited afterward by Benjamin, was the first to be attacked. It was not until after several towns of this district had, one by one, fallen into the hands of the conquerors that the Canaanites set about a united resistance. They were, however, decisively repulsed by Joshua in the neighborhood by Gibeon; and by this victory the Israelites became masters of the whole central plateau of Palestine. The first camp, at Gilgal, near the ford of Jordan, which had been maintained until then, was now removed, and the ark of Jehovah brought further inland (perhaps by way of Bethel) to Shiloh, where henceforward the headquarters were fixed, in a position which seemed as if it had been expressly made to favor attacks upon the fertile tract lying beneath it on the north. The Bne Rachel now occupied the new territory which, up to that time, had been acquired—Benjamin, in immediate contiguity with the frontier of Judah, then Ephraim, stretching to beyond Shiloh, and lastly Manasseh, furthest to the north, as far as to the plain of Jezreel. The center of gravity, so to speak, already lay in Ephraim, to which belonged Joshua and the ark.

It is mentioned as the last achievement of Joshua that at the waters of Merom he defeated Jabin, king of Hazor, and the allied princes of Galilee, thereby opening up the north for Israelitish settlers. It is quite what we should expect, that a great and united blow had to be struck at the Canaanites of the north before the new comers could occupy it in peace; and King Jabin, who reappears at a later date, certainly does not suit the situation described in Judges iv., v.

Even after the united resistance of the Canaanites had been broken, each individual community had still enough to do before it could take firm hold of the spot which it had searched out for itself or to which it had been assigned. The business of effecting permanent settlement was just a continuation of the former struggle, only on a diminished scale; every tribe and every family now fought for its own hand after the preliminary work had been accomplished by a united effort. Naturally, therefore, the conquest was at first but an incomplete one. The plain which fringed the coast was hardly touched; so also the valley of Jezreel, with its girdle of fortified cities stretching from Acco to Beth-shean. All that was subdued, in the strict sense of that word, was the mountainous land, particularly the southern hill country of "Mount Ephraim;" yet even here the Canaanites retained possession of not a few cities, such as Jebus, Shechem, Thebez. It was only after the lapse of centuries that all the lacunæ were filled up, and the Canaanite enclaves made tributary.

The Israelites had the extraordinarily disintegrated state of the enemy to thank for the ease with which they had achieved success. The first storm subsided comparatively soon, and conquerors and conquered alike learned to accommodate themselves to the new circumstances. Then the Canaanites once more collected all their energies to strike a blow for freedom. Under the hegemony of Sisera a great league was formed, and the plain of Jezreel became the center of the reorganized power which made itself felt by its attacks both northward and southward. The Israelites were strangely helpless; it was as if neither shield nor spear could be found among their 40,000 fighting men. But at last there came an impulse from above, and brought life and soul to the unorganized mass; Deborah sent out the summons to the tribes, Barak came forward as their leader against the kings of Canaan, who had assembled under Sisera's command by the brook Kishon. The cavalry of the enemy was unable to withstand the impetuous rush of the army of Jehovah, and Sisera himself perished in the flight. From that day the Canaanites, although many strong towns continued to be held by them, never again raised their heads.

After these occurrences some further changes of a fundamental character took place in the relations of the tribes. The Danites proved unable to hold against the forward pressure of the Philistines their territory on the coast to the west of Benjamin and Ephraim; they accordingly sought a new settlement, which was found in the north at the foot of Hermon. In this way all the secondary tribes westward of Jordan (Asher, Naphtali, Dan) came to have their seats beside each other in the northern division of the land. Eastward of Jordan, Reuben rapidly fell from his old prominence, sharing the fate of his next eldest brethren Simeon and Levi. When Eglon of Moab took Jericho, and laid Benjamin under tribute, it is obvious that he must previously have made himself master of Reuben's territory. This territory became thenceforward a subject of constant dispute between Moab and Israel; the efforts to recover it, however, did not proceed from Reuben himself, but from Gad, a tribe which knew how to assert itself with vigor against the enemies by which it was surrounded. But, if the Hebrews lost ground in the south, they materially enlarged their borders in the north of the land eastward of Jordan. Various Manassite families, finding their holdings at home too small, crossed the Jordan and founded colonies in Bashan and northern Gilead. Although this colonization, on account of the rivalry of the Aramæans, who were also pressing forward in this direction, was but imperfectly successful, it nevertheless was of very great importance, inasmuch as it served to give new strength to the bonds that united the eastern with the western tribes. Not only was Gilead not lost; it even became a very vigorous member of the body politic.

The times of agitation and insecurity which followed upon the conquest of Palestine invited attacks by the eastern nomads, and once more the Israelite peasantry showed all its old helplessness, until at last the indignation of a Manassite of good family, Gideon or Jerubbaal, was roused by the Midianites, who had captured some of his brothers and put them to death. With his family, that of Abiezer, he gave pursuit, and, overtaking the enemy on the borders of the wilderness, inflicted on them such chastisement as put an end to these incursions. His heroism had consequences which reached far beyond the scope of his original purpose. He became the champion of the peasantry against the freebooters, of the cultivated land against the waste; social respect and predominance were his rewards. In his native town of Ophrah he kept up a great establishment, where also he built a temple with an image of Jehovah overlaid with the gold which he had taken from the Midianites. He transmitted to his sons an authority, which was not limited to Abiezer and Manasseh alone, but, however slightly and indirectly, extended over Ephraim as well.

On the foundations laid by Gideon Abimelech his son sought to establish a kingship over Israel, that is, over Ephraim and Manasseh. The predominance, however, which had been naturally accorded to his father in virtue of his personal merits, Abimelech looked upon as a thing seized by force, and to be maintained with injustice; and in this way he soon destroyed those fair beginnings out of which even at that time a kingdom might have arisen within the house of Joseph. The one permanent fruit of his activity was that Shechem was destroyed as a Canaanite city, and rebuilt for Israel.

The most important change of the period of the judges went on gradually and in silence. The old population of the country, which, according to Deuteronomy, was to have been exterminated, slowly became amalgamated with the new. In this way the Israelites received a very important accession to their numbers. In Deborah's time the fighting men of Israel numbered 40,000; the tribe of Dan, when it migrated to Laish, counted 600 warriors; Gideon pursued the Midianites with 300. But in the reigns of Saul and David we find a population of two to three millions. The rapid increase is to be accounted for by the incorporation of the Canaanites.

At the same time the Hebrews learned to participate in the culture of the Canaanites, and quietly entered into the enjoyment of the labors of their predecessors. From the pastoral they advanced to the agricultural stage; corn and wine, the olive and the fig, with them are habitually spoken of as the necessaries of life. It was not strange that this change in the manner of their everyday life should be attended with certain consequences in the sphere of religion also. It is inconceivable that the Israelites should have brought with them out of the desert the cultus they observed in the time of the kings, which throughout presupposed the fields and gardens of Palestine; they borrowed it from the Canaanites. This is confirmed by the fact that they took over from these the "Bamoth" or "high places" also, notwithstanding the prohibition in Deut. xii.

It was natural enough that the Hebrews should also appropriate the divinity worshiped by the Canaanite peasants as the giver of their corn, wine, and oil, the Baal whom the Greeks identified with Dionysus. The apostasy to Baal, on the part of the first generation which had quitted the wilderness and adopted a settled agricultural life, is attested alike by historical and prophetical tradition. Doubtless Baal, as the god of the land of Canaan, and Jehovah, as God of the nation of Israel, were in the first instance coördinated. But it was not to be expected that the divinity of the land should permanently be different from the God of the dominant people. In proportion as Israel identified itself with the conquered territory, the divinities also were identified. Hence arose a certain syncretism between Baal and Jehovah, which had not been got over even in the time of the prophet Hosea. At the same time the functions of Baal were more frequently transferred to Jehovah than conversely. Canaan and Baal represented the female, Israel and Jehovah the male, principle in this union.

Had the Israelites remained in the wilderness and in barbarism, the historical development they subsequently reached would hardly have been possible; their career would have been like that of Amalek, or, at best, like those of Edom, Moab, and Ammon. Their acceptance of civilization was undoubtedly a step in the forward direction; but as certainly did it also involve a peril. It involved an overloading, as it were, of the system with materials which it was incapable of assimilating at once. The material tasks imposed threatened to destroy the religious basis of the old national life. The offensive and defensive alliance among the tribes gradually dissolved under the continuance of peace; the subsequent occupation of the country dispersed those whom the camp had united. The enthusiastic *élan* with which the conquest had been achieved gave way to the petty drudgery by which the individual families, each in its own circle, had to accommodate themselves to their new surroundings. Yet under the ashes the embers were still aglow; and the course of history ever fanned them anew into flame, bringing home to Israel the truths that man does not live by bread alone, and that there are other things of worth than those which Baal can bestow; it brought ever again into the foreground the divineness of heroical self-sacrifice of the individual for the good of the nation.

The Philistines were the means of arousing from their slumber Israel and Jehovah. From their settlements by the sea, on the low-lying plain which skirts the mountains of Judah on the west, they pressed northward into the plain of Sharon, and thence into the plain of Jezreel beyond, which is connected with that of Sharon by the upland valley of Dothan. Here, having driven out the Danites, they came into direct contact with the tribe of Joseph, the chief bulwark of Israel, and a great battle took place at Aphek, where the plain of Sharon merges into the valley of Dothan. The Philistines were victorious and carried off as a trophy the Israelite standard, the ark of Jehovah. Their further conquests included, not only the plain of Jezreel and the hill country bordering it on the south, but also the proper citadel of the country, "Mount Ephraim." The old sanctuary at Shiloh was destroyed by them; its temple of Jehovah thenceforward lay in ruins. Their supremacy extended as far as to Benjamin; the Philistines had a *neçib* in Gibeah. But the assertion that they had confiscated all weapons and removed all smiths must regarded as an unhistorical exaggeration; under their régime at all events it was possible for the messengers of a beleaguered city on the east of Jordan to summon their countrymen in the west to their relief.

The shame of the Israelites under the reproach of

Philistine oppression led in the first instance to a widespread exaltation of religious feeling. Troops of ecstatic enthusiasts showed themselves here and there, and went about with musical accompaniments in processions which often took the shape of wild dances; even men of the most sedate temperament were sometimes smitten with the contagion, and drawn into the charmed circle. In such a phenomenon, occurring in the East, there was nothing intrinsically strange; among the Canaanites, such "Nebiim"—for so they were styled—had long been familiar, and they continued to exist in the country after the old fashion, long after their original character, so far as Israel was concerned, had been wholly lost. The new thing at this juncture was that this spirit passed over upon Israel, and that the best members of the community were seized by it. It afforded an outlet for the suppressed excitement of the nation.

The new-kindled zeal had for its object, not the abolition of Baal worship, but resistance to the enemies of Israel. Religion and patriotism were then identical. This spirit of the times was understood by an old man, Samuel ben Elkanah, who lived at Ramah in southwestern Ephraim. He was not himself one of the Nebiim; on the contrary, he was a seer of that old type which had for a long time existed among the Hebrews much as we find it among the Greeks or Arabs. Raised by his foreseeing talent to a position of great prominence, he found opportunity to occupy himself with other questions besides those which he was professionally called on to answer. The national distress weighed upon his heart; the neighboring peoples had taught him to recognize the advantages which are secured by the consolidation of families and tribes into a kingdom. But Samuel's peculiar merit lay, not in discovering what it was that the nation needed, but in finding out the man who was capable of supplying that need. Having come to know Saul ben Kish, a Benjamite of the town of Gilead, a man of gigantic form, and swift, enthusiastic nature, he declared to him his destiny to become king over Israel.

Saul very soon had an opportunity for showing whether Samuel had been a true seer or no. The city of Jabesh in Gilead was beseiged by the Ammonites, and the inhabitants declared themselves ready to surrender should they fail in obtaining speedy succor from their countrymen. Their messengers had passed through all Israel without meeting with anything more helpful than pity, until at last tidings of their case reached Saul as he was returning with a yoke of oxen from the field. Hewing his cattle in pieces, he caused the portions to be sent in all directions, with the threat that so should it be done with the oxen of everyone who should refuse to help in relieving Jabesh. The people obeyed the summons, fell suddenly one morning upon the Ammonites, and delivered the beleaguered city.

Having thus found Saul the man for their need, they refused to let him go. In Gilgal, Joshua's old camp, they anointed him king. The act was equivalent to imposing upon him the conduct of the struggle against the Philistines, and so he understood it. The first signal for the attack was given by his son Jonathan, when he slew the *neçib* of the Philistines at Gibeah. These in consequence advanced in force toward the focus of the revolt, and took up a position opposite Gibeah on the north, being divided from it only by the gorge of Michmash. Only a few hundred Benjamites ventured to remain with Saul. The struggle opened with a piece of genuine old heroic daring. While the Philistines were dispersed over the country in foraging expeditions, Jonathan, accompanied by his armor-bearer only, and without the knowledge of Saul, made an attack upon the weak posts which they had left behind at the pass of Michmash. After the first had been surprised and overmastered, the others took to flight, no doubt in the belief that the two assailants were supported. They carried their panic with them into the half-deserted camp, whence it spread among the various foraging bands. The commotion was observed from Gibeah opposite, and, without stopping to consult the priestly oracle, King Saul determined to attack the camp. The attempt was completely successful, but involved no more than the camp and its stores; the Philistines themselves effected an unmolested retreat by the difficult road of Bethhoron.

Saul was no mere stripling when he ascended the throne; he had already a grown-up son at his side. Nor was he of insignificant descent, the family to which he belonged being a widespread one, and his heritage considerable. His establishment at Gibeah was throughout his entire reign the nucleus of his kingdom. The men on whom he could always reckon were his Benjamite kinsmen. He recognized as belonging to him no other public function besides that of war; the internal affairs of the country he permitted to remain as they had been before his accession. War was at once the business and the resource of the new kingdom. It was carried on against the Philistines without interruption, though for the most part not in the grand style but rather in a series of border skirmishes.

It is not without significance that the warlike revival of the nation proceeded from Benjamin. By the battle of Aphek Ephraim had lost at once the hegemony and its symbols (the camp-sanctuary at Shiloh, the ark of the covenant). The center of Israel gravitated southward, and Benjamin became the connecting link between Ephraim and Judah. It would appear that there the tyranny of the Philistines was not so much felt. Their attacks never were made through Judah, but always came from the north; on the other hand, people fled from them southward, as is instanced by the priests of Shiloh, who settled in Nob near Jerusalem. Through Saul Judah entered definitely into the history of Israel; it belonged to his kingdom, and it more than most others supplied him with energetic and faithful supporters. His famous expedition against the Amalekites had been undertaken purely in the interests of Judah, for it only could possibly suffer from their marauding hordes.

Among the men of Judah whom the war brought to Gibeah, David ben Jesse of Bethlehem took a conspicuous place; his skill on the harp brought him into close relations with the king. He became Saul's armor-bearer, afterward the most intimate friend of his son, finally the husband of his daughter. While he was thus winning the affection of the court, he at the same time became the declared favorite of the people, the more so because unexampled good fortune attended him in all he undertook. This excited the jealousy of Saul, naturally enough in an age in which the king always required to be the best man. Its first outburst admitted of explanation as occasioned by an attack of illness; but soon it became obtrusively clear that the king's love for his son-in-law had changed into bitter hatred. Jonathan warned his friend and facilitated his flight, the priests of Nob at the same time providing him with arms and food. He went into the wilderness of Judah, and became the leader of a miscellaneous band of outlaws who had been attracted by his name to lead a roving life, under his leadership. His kinsmen from Bethlehem were of their number, but also Philistines and Hittites. Out of this band David's bodyguard subsequently grew, the nucleus of his army. They reckoned also a priest among them, Abiathar ben Ahimelech ben Ahitub ben Phinehas ben Eli, the solitary survivor of the massacre of the sons of Eli at Nob which Saul had ordered on account of suspected conspiracy with David. Through him David was able to have recourse to the sacred lot before the ephod. In the end he found it impossible to hold his own in Judah against Saul's persecutions, especially as his countrymen for the most part withheld their assistance. He therefore took the desperate step of placing his services at the disposal of Achish, the Philistine king of Gath, by whom he was received with open arms, the town of Ziklag being assigned him as a residence. Here with his band he continued to follow his old manner of life as an independent prince, subject only to an obligation to render military service to Achish.

Meanwhile the Philistines had once more mustered their forces and marched by the usual route against Israel. Saul did not allow them to advance upon Gibeah, but awaited their attack in the plain of Jezreel. A disastrous battle on Mount Gilboa ensued; after seeing his three eldest sons fall one after the other at his side, Saul threw himself upon his sword, and was followed by his armor-bearer. The defeat seemed to have undone the work of his life. The immediate consequence at least was that the Philistines regained their lost ascendancy over the country to the west of Jordan. Beyond Jordan, however, Abner, the cousin and generalissimo of Saul, made his son, Ishbaal, still a minor, king in Mahanaim, and he was successful in again establishing the dominion of the house over Jezreel, Ephraim, and Benjamin, of course in uninterrupted struggle with the Philistines.

But he did not regain hold of Judah. David seized the opportunity to set up for himself, with the sanction of the Philistines, and, it may safely be presumed, as their vassal, a separate principality which had its center of gravity in the south, which was inhabited, not by the tribe of Judah properly so called, but by the Calebites and Jerachmeelites. This territory Abner disputed with him in vain. In the protracted feud between the houses of Saul and David, the fortunes of war declared themselves ever increasing for the latter. Personal causes at last brought matters to a crisis. Abner, by taking to himself a concubine of Saul's, called Rizpah, had roused Ishbaal's suspicions that he was aiming at the inheritance, and was challenged on the point. This proved too much for his patience, and forthwith he abandoned the cause of his ward (the hopelessness of which had already perhaps become apparent), and entered into negotiations with David at Hebron. When about to set out on his return he fell by the hand of Joab in the gate of Hebron, a victim of jealousy and blood-feud. His plans nevertheless were realized. His death left Israel leaderless and in great confusion; Ishbaal was personally insignificant, and the people's homage continued to be rendered to him only out of grateful fidelity to his father's memory. At this juncture he also fell by assassins' hands. As he was taking his mid-day rest, and even the portress had gone to sleep over her task of cleaning wheat, two Benjamite captains introduced themselves into his palace at Mahanaim and murdered him in the vain hope of earning David's thanks. The elders of Israel no longer hesitated about offering David the crown, which he accepted.

His residence was immediately transferred from Hebron to Jebus, which until then had remained in possession of the Canaanites, and first derives historical importance from him. It lay on the border between Israel and Judah—still within the territory of Benjamin, but not far from Bethlehem; near also to Nob, the old priestly city. David made it not only the political but also the religious metropolis by transferring thither from Kirjathjearim the ark of the covenant, which he placed within his citadel on what afterward became the temple hill.

Still the crown was far from being a merely honorary possession; it involved heavy responsibilities, and doubtless what contributed more than anything else to David's elevation to the throne was the general recognition of the fact that he was the man best fitted on the whole to undertake the labor it brought with it, viz., the prosecution of the war with the Philistines, a war which was as it were the forge in which the kingdom of Israel was welded into one. The struggle began with the transferrence of the seat of royalty to Jerusalem; unfortunately we possess only scanty details as to its progress, hardly anything more indeed than a few anecdotes about deeds of prowess by individual heroes. The result was in the end that David completed what Saul had begun, and broke forever the Philistine yoke. This was undoubtedly the greatest achievement of his reign.

From the defensive against the Philistines David proceeded to aggressive war, in which he subjugated the three kinsfolk of Israel, Moab, Ammon, and Edom. He appears to have come into conflict first with the Moabites, whom he vanquished and treated with savage atrocity. Not long afterward the king of Ammon died and David sent an embassy of condolence to Hanun, his successor. Hanun suspected in this a sinister design—a suspicion we can readily understand if David had already, as is probable, subjugated Moab—and with the utmost contumely sent back the messengers to their masters forthwith, at the same time making preparations for war by entering into alliance with various Syrian kings, and particularly with the powerful king of Soba. David took the initiative, and sent his army under command of Joab against Rabbath-Ammon. The Syrians advanced to the relief of the besieged city; but Joab divided his forces, and, leaving his brother Abishai to hold the Ammonites in the town in check, proceeded himself against the Syrians and repulsed them. On their afterward threatening to renew the attack in increased force, David went against them in strength and defeated them at Helam "on the river." It seems that as a result of this the kingdom of Soba was broken up and made tributary to Damascus. Rabbath-Ammon could not now hold out any longer, and the Ammonites shared the fate of their Moabite brethren. Finally, Edom was about the same time coerced and depopulated; and thus was fulfilled the vision of Balaam—the youngest of the four Hebrew nationalities trod the three elder under his feet.

So far as external foes were concerned, David henceforward had peace; but new dangers arose at home within his own family. At once, by ill-judged leniency and equally ill-timed severity, he had completely alienated his son Absalom, who, after Amnon's death, was heir-apparent to the throne. Absalom organized a revolt against his father, and to foster it availed himself of a misunderstanding which had arisen between David and the men of Judah, probably because they thought they were not treated with sufficient favor. The revolt had its focus in Hebron; Ahithophel, a man of Judah, was its soul; Amasa, also of Judah, its arm; but the rest of Israel was also drawn into the rebellion, and only the territory to the east of Jordan remained faithful. Thither David betook himself with precipitancy, for the outbreak had caught him completely by surprise. At Mahanaim, which had once before been the center from which the kingdom was regained, he collected his faithful followers around him, with his 600 Cherethites and Pelethites for a nucleus, Absalom, against Ahithophel's advice, allowing him time for this. In the neighborhood of Mahanaim, in the wood of Ephraim, the decisive blow was struck. Absalom fell, and with his death the rebellion was at an end. It was Joseph that, in the first instance, penitently sent a deputation to the king to bring him back. Judah, on the other hand, continued to hold aloof. Ultimately a piece of finesse on the king's part had the effect of bringing Judah also to its allegiance, though at the cost of kindling such jealousy between Israel and Judah that Sheba, the Benjamite, raised a new revolt, this time of Israelites, which was soon, however, repressed by Joab.

David seems to have died soon afterward. His historical importance is very great. Judah and Jerusalem were wholly his creation, and, though the united kingdom of Israel founded by him and Saul together soon fell to pieces, the recollection of it, nevertheless, continued in all time to be proudly cherished by the whole body of the people. His personal character has often been treated with undue disparagement. For this we must chiefly blame his canonization by the later Jewish tradition, which made a Levitical saint of him and a pious hymn-writer. It then becomes a strange inconsistency that he caused military prisoners to be sawn asunder and burnt, and the bastard sons of Saul to be hanged up before the Lord in Gibeon. But if we take him as we find him, an antique king of a barbarous age, our judgment of him will be much more favorable. The most daring courage was combined in him with tender susceptibility; even after he had ascended the throne, he continued to retain the charm of a preeminent and at the same time childlike personality. Even his conduct in the affair of Uriah is not, by any means, wholly to his discredit; not many kings can be mentioned who would have shown repentance, public and deep, such as he manifested at Nathan's rebuke. Least to his credit was his weakness in relation to his sons and to Joab. On the other hand, the testament attributed to him in 1 Kings ii. cannot be laid to his charge; it is a libel of a later hand seeking to invest him with a fictitious glory. In like manner it is unjust to hold him responsible for the deaths of Abner and Amasa, or to attribute to him any conspiracy with the hierocracy for the destruction of Saul, and thus to deprive him of the authorship of the elegy in 2 Sam. i., which certainly was not the work of a hypocrite.

Solomon had already reached the throne, some time before his father's death—not in virtue of hereditary right, but by a palace intrigue which had the support of the bodyguard of the Six Hundred. His glory was not purchased on the battlefield. So far was he from showing military capacity that he allowed a new Syrian kingdom to arise at Damascus, a far more dangerous thing for Israel than that of Soba, which had been destroyed, and which it succeeded. During this reign Edom also regained its independence, nothing but the port of Elath remaining in Solomon's hands. As regards Moab and Ammon we have no information; it is not improbable that they also revolted. But if war was not Solomon's forte he certainly took much greater pains than either of his predecessors in matters of internal administration; according to tradition, the wisdom of the ruler and the judge was his special "gift." Disregarding the tribal system, he divided his kingdom into twelve provinces, over each of which he placed a royal governor, thus making a beginning of vigorous and orderly adminstration.

Judah alone he exempted from this arrangement, as if to show special favor. For his aim was less the advantage of his subjects than the benefit of his exchequer, and the same object appears in his horse traffic, his Ophir trade, and his cession of territory to Hiram. His passions were architecture, a gorgeous court, and the harem, in which he sought to rival other Oriental kings, as for example his Egyptian father-in-law. For this he required copious means—forced labor tribute in kind, and money. He had specially at heart the extension and improvement of Jerusalem as a strong and splendid capital; the temple which he built was only a portion of his vast citadel, which included within its precincts a number of private and public buildings designed for various uses.

It is plain that new currents were introduced into the stream of the nation's development by such a king as this. As formerly, after the occupation, Canaanite culture had come in, so now, after the establishment of the kingdom, the floodgate was opened for the admission of Oriental civilization in a deeper and wider sense. Whatever the personal motives which led to it may have been, the results were very important, and by no means disadvantageous on the whole. On the basis of the firmer administration now introduced, stability and order could rest; Judah had no cause to regret its acceptance of this yoke. Closer intercourse with foreign lands widened the intellectual horizon of the people, and at the same time awakened it to a deeper sense of its own peculiar individuality. If Solomon imported Phœnician and Egyptian elements into the worship of Jehovah at his court temple, the rigid old Israelite indeed might naturally enough take offense, but the temple itself nevertheless ultimately acquired a great and positive importance for religion. It need not be denied that mischievous consequences of various kinds slipped in along with the good. The king, moreover, can hardly be blamed for his conduct in erecting in the neighborhood of Jerusalem altars to deities of Ammon and Egypt. For those altars remained undisturbed until the time of Josiah, although between Solomon and him there reigned more than one pious king who would certainly have destroyed them had he found them as offensive as did the author of Deuteronomy.

After the death of Solomon the discontent which had been aroused by his innovations, and especially by the rigor of his government, openly showed itself against his successor; and when Rehoboam curtly refused the demands which had been laid before him by an assembly of the elders at Shechem, they withdrew from their allegiance and summoned to be their king the Ephraimite Jeroboam ben Nebat, who already had made an abortive attempt at revolt from Solomon, and afterward had taken refuge in Egypt. Only Judah and Jerusalem remained faithful to the house of David. Among the causes of the revolt of the ten tribes, jealousy of Judah must certainly be reckoned as one. The power of Joseph had been weakened by the Philistines, and by the establishment of the monarchy the center of gravity had been shifted from the north where it naturally lay. But now it was restored to its old seat; for once more it was situated, not in Judah, but in Joseph. Monarchy itself, however, was not abolished by the revolting tribes, conclusively showing how unavoidable and how advantageous that institution was now felt to be; but at the same time they did not refrain from attempts to combine its advantages with those of anarchy, a folly which was ultimately the cause of their ruin. As for their departure from the Mosaic cultus observed at Jerusalem on the other hand, it was first alleged against them as a sin only by the later Jews. At the time religion put no obstacle in the way of their separation; on the contrary, it actually suggested and promoted it (Ahijah of Shiloh). The Jerusalem cultus had not yet come to be regarded as the alone legitimate; that instituted by Jeroboam at Bethel and at Dan was recognized as equally right; images of the Deity were exhibited in all three places, and indeed in every place where a house of God was found. So far as the religious and intellectual life of the nation was concerned, there was no substantial difference between the two kingdoms, except indeed in so far as new displays of vigorous initiative generally proceeded from Israel.

Rehoboam did not readily accept the situation; he sought to reduce the revolt by force of arms, with what degree of success is shown by the fact that his rival found himself constrained to take up his residence at Peniel (near Mahanaim) on the other side of Jordan. The invasion of Shishak, however, who took Jerusalem and burnt it, gave Jeroboam at last a breathing space. The feud continued indeed, but Rehoboam could no longer dream of bringing back the ten tribes. The scale by and by turned in Israel's favor. King Baasha, who had seated himself on the throne in place of Nadab, Jeroboam's son, took the offensive, and Asa ben Rehoboam had no help for it but to call in Benhadad of Damascus against his adversary. In this way he gained his immediate purpose, it is true, but by the most dangerous of expedients.

Baasha's son Elah was supplanted by his vizier Zimri, who, however, was in his turn unable to hold his own against Omri, who had supreme command of the army. Against Omri there arose in another part of the country a rival, Tibni ben Ginath, who succeeded in maintaining some footing until his death, when Omri became supreme. Omri must be regarded as the founder of the first dynasty, in the proper sense of that word, in Israel, and as the second founder of the kingdom itself, to which he gave a permanent capital in Samaria. The Bible has hardly anything to tell us about him, but his importance is evident from the fact that among the Assyrians "the kingdom of Omri" was the ordinary name of Israel. According to the inscription of Mesha, it was he who again subjugated Moab, which had become independent at the death of David or of Solomon. He was not so successful against the Damascenes, to whom he had to concede certain privileges in his own capital.

Ahab, who succeeded Omri his father, seems during the greater part of his reign to have in some sort acknowledged Syrian suzerainty. In no other way can we account for the fact that in the battle of Karkar against the Assyrians (854 B.C.) a contingent was contributed by him. But this very battle made the political situation so clear that he was led to break off his relations with Damascus. With this began a series of ferocious attacks on Israel by Benhadad and Hazael. They were met by Ahab with courage and success, but in the third year of that fifty years' war he fell in the battle at Ramoth Gilead (*c.* 851).

When the prophets first made their appearance, some time before the beginning of the Philistine war, they were a novel phenomenon in Israel; but in the interval they had become so naturalized that they now had a recognized and essential place in connection with the religion of Jehovah. They had in the process divested themselves of much that had originally characterized them, but they still retained the habit of appearing in companies and living together in societies, and also that of wearing a peculiar distinctive dress. These societies of theirs had no ulterior aims; the rabbinical notion that they were schools and academies in which the study of the Torah and of sacred history was pursued imports later ideas into an earlier time. First-rate importance on the whole cannot be claimed for the Nebiim, but occasionally there arose among them a man in whom the spirit which was cultivated within their circles may be said to have risen to the explosive pitch. Historical influence was exercised at no time save by these individuals who rose above their order and even placed themselves in opposition to it, but always at the same time had their base of operations within it. The prototype of this class of exceptional prophets, whom we not unjustly have been accustomed to regard as the true, is Elijah of Thisbe, the contemporary of Ahab.

In compliment to Jezebel, his wife, Ahab had set up in Samaria a temple with richly endowed religious services in honor of the Syrian Baal. In doing so he had no intention of renouncing Jehovah; Jehovah continued to be the national God after whom he named his sons Ahaziah and Jehoram. The destruction of Jehovah's altars or the persecution of His prophets was not at all proposed, or even the introduction of a foreign cultus elsewhere than in Samaria. Jehovah's sovereignty over Israel being thus only remotely if at all imperiled, the popular faith found nothing specially offensive in a course of action which had been followed a hundred years before by Solomon also. Elijah alone was strenuous in his opposition; the masses did not understand him, and were far from taking his side. To him only, but not to the nation, did it seem like a halting between two opinions, an irreconcilable inconsistency, that Jehovah should be worshiped as Israel's God and a chapel to Baal should at the same time be erected in Israel.

In solitary grandeur did this prophet tower conspicuously over his time; legend, and not history, could alone preserve the memory of his figure. There remains a vague impression that with him the development of Israel's conception of Jehovah entered upon a new stadium, rather than any data from which it can be ascertained wherein the contrast of the new with the old lay. After Jehovah, acting more immediately within the political sphere, had established the nation and kingdom, he now began in the spiritual sphere to operate against the foreign elements, the infusion of which previously had been permitted to go on almost unchecked. The Rechabites, who arose at that time, protested in their zeal for Jehovah altogether against all civilization which presupposes agriculture, and in their fundamental principles aimed at a recurrence to the primitive nomadic life of Israel in the wilderness; the Nazarites abstained at least from wine, the chief symbol of Dionysiac civilization. In this indeed Elijah was not with them; had he been so, he would doubtless have been intelligible to the masses. But, comprehending as he did the spirit from which these demonstrations proceeded, he thought of Jehovah as a great principle which cannot coëxist in the same heart with Baal. To him first was it revealed that we have not in the various departments of nature a variety of forces worthy of our worship, but that there exists over all but one Holy One and one Mighty One, who reveals Himself not in nature but in law and righteousness in the world of man. The indignation he displayed against the judicial murder at Jezreel was as genuine and strong as that which he manifested against the worship of Baal in Samaria; the one was as much a crime against Jehovah as the other.

Elijah ascended to heaven before he had actually achieved much in the world. The idea which his successors took from him was that it was necessary to make a thorough clearance from Samaria of the Baal worship and of the house of Ahab as well. For this practical end Elisha made use of practical means. When Elijah, after the murder of Naboth, had suddenly appeared before Ahab and threatened him with a violent end, an officer of high command had been present, Jehu ben Nimshi, and he had never forgotten the incident. He now found himself at the head of the troops at Ramoth Gilead after the withdrawal to Jezreel of Joram ben Ahab from the field to be healed of his wound. To Elisha the moment seemed a suitable one for giving to Jehu in Jehovah's name the command now to carry out Elijah's threat against the house of Ahab. Jehu gained over the captains of the army, and carried out so well the task with which the prophet had commissioned him that not a single survivor of Ahab's dynasty or of his court was left. He next extirpated Baal and his worshipers in Samaria. From that date no worship of foreign gods seems ever to have recurred in Israel. Idolatry indeed continued to subsist, but the images, stones, and trees, even the teraphim apparently, belonged to the cultus of Jehovah, or were at least brought into relation with it.

Jehu founded the second and last dynasty of the kingdom of Samaria. His inheritance from the house of Omri included the task of defending himself against the Syrians. The forces at his disposal being insufficient for this, he resorted to the expedient of seeking to urge the Assyrians to renew their hostilities against the Aramæans. For this end his ambassadors carried presents to Shalmaneser II.; these were not of a regular but only of an occasional character, but the vanity of the great king represents them as the tribute of a vassal. In the years 842 and 839 Assyrian campaigns against Hazael of Damascus actually took place; then they were intermitted for a long time, and the kings of Samaria, Jehu and his two successors, were left to their own resources. These were evil times for Israel. With a barbarity never intermitted the frontier war went on in Gilead, where Ammon and Moab showed themselves friendly to the Syrian cause; occasionally great expeditions took place, one of which brought king Hazael to the very walls of Jerusalem. It was only with the greatest difficulty that Israel's independence was maintained. Once more religion went hand in hand with the national cause; the prophet Elisha was the mainstay of the kings in the struggle with the Syrians, "the chariot and horsemen of Israel." Joash ben Joahaz ben Jehu at last succeeded in inflicting upon Syria several blows which proved decisive. Thenceforward Israel had nothing to fear from that quarter. Under Joash's son, Jeroboam II., the kingdom even reached a height of external power which recalled the times of David. Moab was again subdued; southward the frontier extended to the brook of the wilderness, and northward to Hamath.

Under King Jeroboam II., two years before a great earthquake that served ever after for a date to all who had experienced it, there occurred at Bethel, the greatest and most conspicuous sanctuary of Jehovah in Israel, a scene full of significance. The multitude were assembled there with gifts and offerings for the observance of a festival, when there stepped forward a man whose grim seriousness interrupted the joy of the feast. It was a Judæan, Amos of Tekoa, a shepherd from the wilderness bordering on the Dead Sea. Into the midst of the joyful tones of the songs which with harp and tabor were being sung at the sacred banquet he brought the discordant note of the mourner's wail. For over all the joyous stir of busy life his ear caught the sounds of death: "the virgin of Israel is fallen, never more to rise; lies prostrate in her own land with no one to lift her up." He prophesied as close at hand the downfall of the kingdom which just at that moment was rejoicing in the consciousness of power, and the deportation of the people to a far-off northern land.

There was something rotten in the state of Israel in spite of the halcyon days it enjoyed under Jeroboam II. From the indirect results of war. from changes in the tenure and the culture of the soil, from defective administration of justice, the humbler classes had much to suffer; they found the times were evil. But it was not this that caused Amos to foresee the end of Israel, not a mere vague foreboding of evil that forced him to leave his flocks; the dark cloud that threatened on the horizon was plain enough—the Assyrians. Once already at an earlier date they had directed their course southwestward, without, however, on that occasion becoming a source of danger to the Israelites. But now that the bulwark against the Assyrians, Aram of Damascus, was falling into ruins, a movement of these against Lebanon in the time of Jeroboam II. opened to Israel the alarming prospect that sooner or later they would have to meet the full force of the irresistible avalanche.

The event which Amos had foreseen was not long in coming. The Israelites flew spontaneously, like "silly doves," into the net of the Assyrians. Zechariah ben Jeroboam was overthrown after a short reign; Shallum, his murderer and successor, was also unable to hold his own, and was followed after the horrors of a civil war by Menahem ben Gadi, (745 B.C.) But Menahem, in the presence of domestic (and perhaps also foreign) assailants, had no other resort than to purchase by payment of a great tribute the assistance of King Tiglath-pileser II., who at that time was giving new force to the Assyrian predominance in these regions. By such means he succeeded in attaining his immediate end, but the further consequence was that the rival party in the state turned for support to Egypt, and Palestine now became the arena of conflict between the two great world-powers.

Menahem transmitted his kingdom to Pekahiah; Pekahiah was murdered about 735 B.C. by Pekah, and Pekah himself shortly afterward was overthrown. All this happened within a few years. It would have been possible to conjecture the state of the country in these circumstances, even if we had not been informed of it by means of the prophetical book of Hosea, which dates from the time when the Assyrians had begun indeed to tamper with the country, but had not yet shown their full design. After the death of Jeroboam II. there had been wild outbursts of partisan war; none of the kings who in quick succession appeared and disappeared had real power, none established order. It was as if the danger from without, which was only too obviously threatening the existence of the kingdom, had already dissolved all internal bonds; everyone was at war with his neighbor. Assyrians or Egyptians were called in to support this or that government; by such expedients the internal confusion was, naturally, only increased. Was there any other quarter in which help could yet be sought? The people, led by the priests, turned to the altars of Jehovah, and outdid itself in pious works, as if by any such illusory means, out of all relation to the practical problem in hand, the gangrene of anarchy could possibly be healed. Still more zealous than Amos against the cultus was Hosea, not merely on the ground that it had the absurd motive of forcing Jehovah's favor, but also because it was of heathenish character, nature-worship and idolatry.

The first actual collision between Israel and Assyria occurred in 734. Resin, king of Damascus, and Pekah, king of Samaria, had united in an expedition against Judah, where at that time Ahaz ben Jotham occupied the throne. But Ahaz parried the blow by placing himself under the protection of the Assyrians, who perhaps would in any case have struck in against the alliance between Aram and Israel. Tiglath-pileser made his first appearance in 734, first on the seacoast of Palestine, and subsequently, either in this or in the following year, took up his quarters in the kingdom of the ten tribes. After he had ravaged Galilee and Gilead, he finally concluded a peace in Samaria the capital, conditionally on his receiving the head of King Pekah and considerable yearly tribute. Hosea ben Beeri was raised to the throne in Pekah's place, and acknowledged by the Assyrian as a vassal. For some ten years he held his position quietly, regularly paying his dues. But when at the death of Tiglath-pileser the Syro-Palestinian kingdoms rebelled *en masse*, Samaria also was seized with the delirium of patriotic fanaticism. Relying upon the help of Seve, king of Ethiopia and Egypt, Hosea ventured on a revolt from Assyria. But the Egyptians left him in the lurch as soon as Shalmaneser IV., Tiglath-pileser's successor, invaded his territory. Before his capital had fallen, Hosea himself fell into the hands of the Assyrians. Samaria offered a desperate resistance, and succumbed only to Sargon, Shalmaneser's successor (721). Energetic measures were adopted by the victor for the pacification of the country; he carried all the inhabitants of mark into captivity to Calachene, Gozanitis, and Armenia. A remnant indeed of the ancient kingdom was still permitted to survive under kings who were mere vassals; it continued to subsist until the days of Esarhaddon, but the Scriptural representation, according to which the history of Israel terminates in 721, is substantially the most correct. Much light is thrown upon the conditions of the national religion then and upon its subsequent development by the single fact that the exiled Israelites were absorbed by the surrounding heathenism without leaving a trace behind them, while the population of Judah, who had the benefit of a hundred years' respite, held their faith fast throughout the period of the Babylonian exile, and by means of it were able to maintain their own individuality afterward in all the circumstances that arose. The fact that the fall of Samaria did not hinder but helped the religion of Jehovah is entirely due to the prophets. That they had foreseen the downfall of the state, and declared in the name of religion that it was inevitable, was a matter of much greater historical importance than the actual downfall itself.

Hitherto the small kingdom of Judah had stood in the background. Its political history had been determined almost exclusively by its relation to Israel. Under the dynasty of Omri the original enmity had been changed into a close but perhaps not quite voluntary friendship. Judah found itself drawn completely into the train of the more powerful neighboring state, and seems even to have rendered it military service. The fall of the house of Omri was an ominous event for Judah as well as Israel; Jehu, as he passed to the throne, put to death not only Ahaziah the king, but also two and forty other members of the royal house of David who had fallen into his hands; and those who still survived, children for the most part, were murdered wholesale by the regent Athaliah for reasons that are unknown. Only one little boy, Joash, was concealed from her fury, and by a successful conspiracy six years afterward was placed upon the throne of his ancestors. At that time the Syrians were extending their incursions to Judah and Philistia, and Joash bought them off from Jerusalem with temple treasures. Perhaps it was this disgrace that he expiated with his death; in like manner perhaps the assassination of his successor Amaziah is to be accounted for by the discredit he had incurred by a reckless and unsuccessful war against Israel. Just as Israel was beginning to recover itself after the happy termination of the Syrian wars, Judah also experienced its period of highest prosperity. What Jeroboam II. was to the northern kingdom, Uzziah was to that of the south. He appears to have obtained possession of Edom, and for a considerable time to have held that one province of David's conquests which fell to Judah; and at the trading port of Elath he revived the commerce which Solomon had created. The prosperity of his long reign was uninterrupted till in his later years he was smitten with leprosy, and found it necessary to hand over the affairs of the kingdon to his son Jotham. But Jotham appears to have died about the same time as his father—his successor, still in very early youth, being Ahaz ben Jotham ben Uzziah.

If Judah could not compare with Israel in political and general historical importance, it nevertheless enjoyed more than one considerable advantage over the larger kingdom. It was much safer from foreign foes; for the Egyptians, as a rule, were not dangerous neighbors. But its chief advantage consisted in the stability of its dynasty. It was David who had elevated Judah and Jerusalem to a position of historical significance, and the prosperity of his house was most intimately connected with that of the town and territory, and even with that of religion. On two separate occasions it occurred that a king of Judah was murdered by subjects, but in both cases the "people of the land" rose up against the assassins and once more placed a member of the Davidic family upon the throne. The one actual recorded revolution was that against Athaliah, which had for its object the restoration of the throne to the legitimate heir. Under shelter of the monarchy the other institutions of the state also acquired a measure of permanency such as was not found at all in Israel, where everything depended on the character of individuals, and the existing order of things was ever liable to be subjected to fresh dispute. Life in Judah was a much more stable affair, though not so exciting or dramatic. Possibly the greater isolation of the little kingdom, its more intimate relations with the neighboring wilderness, and the more primitive modes of life which resulted were also factors which contributed to this general result.

In the capital of course the life was not primitive, and its influence was undoubtedly greater than that of the country. Successive kings exerted themselves for its external improvement, and in this respect Hezekiah ben Ahaz was specially distinguished. Above all they manifested sincere interest in the temple, which from an early period exerted a powerful force of attraction over the entire mass of the population. They regulated the cultus according to their individual tastes, added to it or curtailed it at their pleasure, and dealt with the sacred treasures as they chose. Although the priests had in a certain sense great power—the conspiracy against Athaliah was led not by a prophet but by a priest—they were nevertheless subjects of the king, and had to act according to his orders. That the cultus of Jehovah at Jerusalem was purer than that at Bethel or at Samaria is an assertion which is contradicted by more than one well-attested fact. In this respect there was no essential difference between Israel and Judah. It was in Israel that the reaction against Baal-worship originated which afterward passed over into Judah; the initiative in all such matters was Israel's. There the experiments were made from which Jerusalem learned the lesson. How deep was the interest felt in the affairs of the larger kingdom by the inhabitants even of one of the smaller provincial towns of Judah is shown in the instance of Amos of Tekoah.

Step by step with the decline of Israel after the death of Jeroboam II. did Judah rise in importance; it was already preparing to take the inheritance. The man through whom the transition of the history from Israel to Judah was effected, and who was the means of securing for the latter kingdom a period of respite which was fruitful of the best results for the consolidation of true religion, was the prophet Isaiah. The history of his activity is at the same time the history of Judah during that period.

Isaiah became conscious of his vocation in the year of King Uzziah's death; his earliest discourses date from the beginning of the reign of Ahaz. In them he contemplates the imminent downfall of Samaria, and threatens Judah also with the chastisement its political and social sins deserve. To the very last he endeavored to restrain Ahaz from his purpose of summoning the Assyrians to his help; he assured him of Jehovah's countenance, and offered him a token in pledge. When the king refused this, the prophet recognized that matters had gone too far, and that the coming of the Assyrians could not be averted. He then declared that the dreaded danger would indeed be obviated by that course, but that another far more serious would be incurred. For the Egyptians would resist the westward movement of Assyria, and Judah as the field of war would be utterly laid waste; only a remnant would remain as the basis of a better future.

The actual issue, however, was not yet quite so disastrous. The Egyptians did not interfere with the Assyrians, and left Samaria and Damascus to their fate. Judah became indeed tributary to Assyria, but at the same time enjoyed considerable prosperity.

While thirty years passed thus peacefully away so far as foreign relations were concerned, internal changes of all the greater importance were taking place. Hezekiah ben Ahaz undertook for the first time a thoroughgoing reformation in the cultus of Jehovah. "He removed the high places, and brake the pillars, and cut down the Ashera, and brake in pieces the brazen serpent that Moses had made;" so we are told in 2 Kings, with a mixture of the general and the special that does not inspire much confidence. But in every respect there must have been a wide difference between the objects and results of the reformations of Hezekiah and Josiah. Undoubtedly Hezekiah undertook his reforms in worship under the influence of Isaiah. Following in the footsteps of Hosea, who had been the first to take and to express offense at the use of images in the worship of Jehovah, this prophet, utilizing the impression which the destruction of Samaria had produced in Jerusalem, strove to the utmost against the adoration of the work of men's hands in the holy places, against the Asheras and pillars (sun-pillars), and above all against the ephods, *i.e.*, the idols of silver and gold, of which the land was full. But against the high places in and by themselves, against the multiplicity of the altars of Jehovah, he made no protest.

Sargon, king of Assyria, was succeeded in 705 by Sennacherib. The opportunity was seized by Merodach Baladan of Babylon to secure his independence; and by means of an embassy he urged Hezekiah also to throw off the yoke. The proposal was adopted, and the king of Judah was joined by other petty kingdoms, especially some of the Philistine towns. Relations with Egypt were established to secure its support in case of need. Sennacherib's more immediate and pressing business in Babylon enabled Palestine to gain some time; but the issue of that revolt made self-deception impossible as to the probable result of the other movement.

This was the period at which Isaiah, already far advanced in life, wielded his greatest influence. The preparations for revolt, the negotiations with Egypt, were concealed from him—a proof how greatly he was feared at court. When he came to know of them, it was already too late to undo what had been done. But he could at least give vent to his anger. With Jerusalem, it seemed to him, the story of Samaria was repeating itself; uninstructed by that sad lesson, the capital was giving itself up to the mad intoxication of leaders who would inevitably bring her to ruin.

Meanwhile Sennacherib, at the head of a great army, was advancing against Philistia and Judah along the Phœnician coast (701). Having captured Ascalon, he next laid siege to Ekron, which, after the combined Egyptian and Ethiopian army sent to its relief had been defeated at Eltheke, fell into the enemy's hand, and was severely dealt with. Simultaneously various fortresses of Judah were occupied, and the level country was devastated. The consequence was that Hezekiah, in a state of panic, offered to the Assyrians his submission, which was accepted on payment of a heavy penalty, he being permitted, however, to retain possession of Jerusalem. He seemed to have got cheaply off from the unequal contest.

The way being thus cleared, Sennacherib pressed on southward, for the Egyptians were collecting their forces against him. The nearer he came to the enemy the more undesirable did he find it that he should leave in his rear so important a fortress as Jerusalem in the hands of a doubtful vassal. Notwithstanding the recently ratified treaty, therefore, he demanded the surrender of the city, believing that a policy of intimidation would be enough to secure it from Hezekiah. But there was another personality in Jerusalem of whom his plans had taken no account. Isaiah had indeed regarded the revolt from Assyria as a rebellion against Jehovah Himself, and therefore as a perfectly hopeless undertaking which could only result in the utmost humiliation and sternest chastisement for Judah. But still more distinctly than those who had gone before him did he hold firm as an article of faith the conviction that the kingdom would not be utterly annihilated; all his speeches of solemn warning closed with the announcement that a remnant should return and form the kernel of a new commonwealth to be fashioned after Jehovah's own heart. For him, in contrast to Amos, the great crisis had a positive character; in contrast to Hosea, he did not expect a temporary suspension of the theocracy, to be followed by its complete reconstruction, but in the pious and God-fearing individuals who were still to be met with in this Sodom of iniquity, he saw the threads, thin indeed, yet sufficient, which formed the links between the Israel of the present and its better future. Over against the vain confidence of the multitude Isaiah had hitherto brought into prominence the darker obverse of his religious belief, but now he confronted their present depression with its bright reverse; faint-heartedness was still more alien to his nature than temerity. In the name of Jehovah he bade King Hezekiah be of good courage, and urged that he should by no means surrender. The Assyrians would not be able to take the city, not even to shoot an arrow into it nor to bring up their siege train against it. And thus it proved in the issue. By a still unexplained catastrophe, the main army of Sennacherib was annihilated on the frontier between Egypt and Palestine, and Jerusalem thereby freed from all danger. The Assyrian king had to save himself by a hurried retreat to Nineveh; Isaiah was triumphant. A more magnificent close of a period of influential public life can hardly be imagined.

The catastrophe which befell the army of Sennacherib had no very great effect upon the external affairs of Judah. Sennacherib indeed, being busy in the east, was unable to retrieve the loss he had sustained, but his son Esarhaddon, who succeeded him in 681, resumed the Egyptian war with better success. He made himself master of the Nile valley, and brought the Ethiopians into submission. That the petty kingdoms of Palestine returned to the old relations of dependence is to be taken as a matter of course. Judah appears to have resumed the yoke voluntarily, but the Samaritans only after force had been applied; they were afterward deported, whereupon the deserted country was occupied by foreign colonists, who, however, accepted the cultus of the god of the land.

That Manasseh ben Hezekiah should have again come under Assyrian suzerainty appears at that time to have made but little impression; since the time of Ahaz Judah had been accustomed to this relation. The book of Kings speaks only of internal affairs under the reign of Manasseh. According to it, he was a bad ruler, who permitted, and even caused, innocent blood to flow like water. But what was of greater consequence for the future, he took up an attitude of hostility toward the prophetic party of reform, and put himself on the side of the reaction which would fain bring back to the place of honor the old popular half-pagan conception of Jehovah, as against the pure and holy God whom the prophets worshiped. The revulsion manifested itself, as the reform had done, chiefly in matters of worship. The old idolatrous furniture of the sanctuaries was reinstated in its place, and new frippery was imported from all quarters, especially from Assyria and Babylon, to renovate the old religion; with Jehovah was now associated a "queen of heaven." Yet, as usual, the restoration did more than merely bring back the old order of things. What at an earlier period had been mere naïveté now became superstition, and could hold its ground only by having imparted to it artificially a deeper meaning which was itself borrowed from the prophetical circle of ideas. Again, earnestness superseded the old joyousness of the cultus; this now had reference principally to sin and its atonement. Value was attached to services rendered to the Deity, just in proportion to their hardness and unnaturalness; at this period it was that the old precept to sacrifice to Jehovah the male that opens the matrix was extended to children. The counter-reformation was far from being unaffected by the preceding reformation, although it understood religious earnestness in quite another sense, and sought, not to eliminate heathenism from the cultus, but to animate it with new life. On the other hand, the reaction was in the end found to have left distinct traces of its influence in the ultimate issue of the reformation.

Manasseh's life was a long one, and his son Amon walked in his ways. The latter died after a brief reign, and with his death a new era for Judah began. It was introduced by the great catastrophe in which the Assyrian empire came to an end. The sovereignty of the world was beginning to pass out of the hands of the Semites into those of the Aryans. Phraortes of Media indeed was unsuccessful in his attempt against the Assyrians, but Cyaxares beat them and proceeded to besiege their capital. The Scythian invasion of Media and western Asia (*c.* 630) at this juncture gave them another respite of six and twenty years; but even it tended to break into pieces the great, loosely-compacted monarchy. The provinces became gradually disintegrated, and the kingdom shriveled up till it covered no more than the land of Asshur.

The inroad of the Scythians aroused to energy again the voice of prophecy which had been dumb during the very sinful but not very animated period of Manasseh's reign. Zephaniah and Jeremiah threatened with the mysterious northern foe, just as Amos and Hosea had formerly done with the Assyrians. The Scythians actually did invade Palestine in 626 (the thirteenth year of Josiah), and penetrated as far as to Egypt; but their course lay along the shore line, and they left Judah untouched. This danger that had come so near and yet passed them by, this instance of a prophetic threatening that had come to pass and yet been mercifully averted, made a powerful impression upon the people of Judah; public opinion went through a revolution in favor of the reforming party which was able to gain for itself the support also of the young king Josiah ben Amon. The circumstances were favorable for coming forward with a comprehensive programme for a reconstruction of the theocracy. In the year 621 (the eighteenth of Josiah) Deuteronomy was discovered, accepted, and carried into effect.

Jehovah and Israel, religion and patriotism, once more went hand in hand. Jeremiah alone did not suffer himself to be misled by the general feeling. He was a second Amos, upon a higher platform—but, unlike his predecessor, a prophet by profession; his history, like Isaiah's, is practically the history of his time. In the work of introducing Deuteronomy he had taken an active part, and throughout his life he showed his zeal against unlawful altars and against the adoration of wood and stone (Asheras and pillars). But he was by no means satisfied with the efforts of the reformation that had been effected; nothing appeared to him more sinful or more silly than the false confidence produced by it in Jehovah and in the inviolability of His one true temple. This confidence he maintained to be delusive; Judah was not a whit better than Israel had been, Jerusalem would be destroyed one day like the temple of Shiloh. The external improvements on which the people of Judah prided themselves he held to leave this severe judgment unaffected; what was needed was a quite different sort of change, a change of heart, not very easy positively to define.

An opportunity for showing his opposition presented itself to the prophet at the juncture when King Josiah had fallen at Megiddo in the battle with Pharaoh Necho (608), and when the people were seeking safety and protection by cleaving to Jehovah and His holy temple. At the instance of the priests and the prophets he had almost expiated with his blood the blasphemies he had uttered against the popular belief; but he did not suffer himself to be driven from his course. Even when the times had grown quiet again, he persisted, at the risk of his life and under universal reproach and ridicule, in his work as a prophet of evil. Moments of despair sometimes came to him; but that he had correctly estimated the true value of the great conversion of the nation was speedily proved by the facts. Although Deuteronomy was not formally abolished under Jehoiakim, who as the vassal of Egypt ascended the throne of his father Josiah, nevertheless it ceased to have practical weight, the battle of Megiddo having shown that in spite of the covenant with Jehovah the possibilities of non-success in war remained the same as before. Jehoiakim tended to return to the ways of Manasseh, not only as regarded idolatry, but also in his contempt for law and the private rights of his subjects; the two things seem to stand in connection.

The course of events at last brought upon the theocracy the visible ruin which Jeremiah had been so long expecting. After the Egyptians had, with comparative ease, subjugated Syria at a time when the Medes and Chaldæans were busied with the siege of Nineveh, Nebuchadnezzar, that task accomplished, came upon them from Babylon and routed them on the Euphrates near Carchemish (605-4). The people of Judah rejoiced at the fall of Nineveh, and also at the result of Carchemish; but they were soon undeceived when the prospect began to open on them of simply exchanging the Egyptian for the Chaldæan yoke. The power of the Chaldæans had been quite unsuspected, and now it was found that in them the Assyrians had suddenly returned to life. Jeremiah was the only man who gained any credit by these events. His much ridiculed "enemy out of the north," of whom he had of old been wont to speak so much, now began to be talked of with respect, although his name was no longer "the Scythian" but "the Babylonian." It was an epoch—the close of an account which balanced in his favor. Therefore it was that precisely at this moment he received the Divine command to commit to writing that which for twenty-three years he had been preaching, and which, ever pronounced impossible, had now shown itself so close at hand.

After the victory of Carchemish the Chaldæans drove Pharaoh out of Syria, and also compelled the submission of Jehoiakim (*c.* 602). For three years he continued to pay his tribute, and then he withheld it; a mad passion for liberty, kindled by religious fanaticism, had begun to rage with portentous power among the influential classes, the grandees, the priests, and the prophets. Nebuchadnezzar satisfied himself in the first instance with raising against Judah several of the smaller nationalities around, especially the Edomites; not till 597 did he appear in person before Jerusalem. The town was compelled to yield; the more important citizens were carried into exile, among them the young king Jechoniah, son of Jehoiakim, who had died in the interval; Zedekiah ben Josiah was made king in his stead over the remnant left behind. The patriotic fanaticism that had led to the revolt was not broken even by this blow. Within four years afterward new plans of liberation began to be again set on foot; but on this occasion the influence of Jeremiah proved strong enough to avert the danger. But when a definite prospect of help from Pharaoh Hophra (Apries) presented itself in 589, the craving for independence proved quite irrepressible. Revolt was declared; and in a very short time the Chaldæan army, with Nebuchadnezzar at its head, lay before Jerusalem. For awhile everything seemed to move prosperously; the Egyptians came to the rescue, and the Chaldæans were compelled to raise the siege in order to cope with them. At this there was great joy in Jerusalem; but Jeremiah continued to express his gloomy views. The event proved that he was right; the Egyptians were repulsed and the siege resumed. The city was bent on obstinate resistance; in vain did Jeremiah, at continual risk of his life, endeavor to bring it to reason. The king, who agreed with the prophet, did not venture to assert his opinion against the dominant terrorism. The town in these circumstances was at last taken by storm, and, along with the temple, reduced to ruins. Cruel vengeance was taken on the king and grandees, and the pacification of the country was insured by another and larger deportation of the inhabitants to Babylon. Thus terminated in 586 the kingdom of Judah.

The exiled Jews had not been scattered all over Chaldæa, but were allowed to remain together in families and clans. Many of them, notwithstanding this circumstance, must have lapsed and become merged in the surrounding heathenism; but many also continued faithful to Jehovah and to Israel. They labored under much depression and sadness, groaning under the wrath of Jehovah, who had rejected His people and canceled His covenant. They were lying under a sort of vast interdict; they could not celebrate any sacrifice or keep any feast; they could only observe days of fasting and humiliation, and such rites as had no inseparable connection with the holy land. The observance of the Sabbath, and the practice of the rite of circumcision, acquired much greater importance than they formerly possessed as signs of a common religion. The meetings on the Sabbath day out of which the synagogues were afterward developed appear to have first come into use during this period; perhaps also even then it had become customary to read aloud from the prophetic writings which set forth that all had happened in the providence of God, and moreover that the days of adversity were not to last forever.

Matters improved somewhat as Cyrus entered upon his victorious career.

For many years the Persian monarch put the patience of the Jews to the proof; Jehovah's judgment upon the Chaldæans, instead of advancing, seemed to recede. At length, however, their hopes were realized; in the year 538 Cyrus brought the empire of Babylon to an end, and gave the exiles leave to seek their fatherland once more. This permission was not made use of by all, or even by a majority. The number of those who returned is stated at 42,360; whether women and children are included in this figure is uncertain. On arriving at their destination, after the difficult march through the desert, they did not spread themselves over the whole of Judah but settled chiefly in the neighborhood of Jerusalem. The Calebites, for example, who previously had had their settlements in and around Hebron, now settled in Bethlehem and in the district of Ephrath. They found it necessary to concentrate themselves in face of a threatened admixture of doubtful elements. From all sides people belonging to the surrounding nations had pressed into the depopulated territory of Judah. Not only had they annexed the border territories—where, for example, the Edomites or Idumæans held the whole of the Negeb as far as to Hebron; they had effected lodgments everywhere, and—as the Ammonites, Ashdodites, and especially the Samaritans—had amalgamated with the older Jewish population, a residue of which had remained in the country in spite of all that had happened. These half-breed "pagani" (Amme haareç ὄχλυι) gave a friendly reception to the returning exiles (Bne haggola); particularly did the Samaritans show themselves anxious to make common cause with them. But they were met with no reciprocal cordiality. The lesson of religious isolation which the children of the captivity had learned in Babylon they did not forget on their return to their home. Here also they lived as in a strange land. Not the native of Judæa, but the man who could trace his descent from the exiles in Babylon, was reckoned as belonging to their community.

The first decennia after the return of the exiles, during which they were occupied in adjusting themselves to their new homes, were passed under a variety of adverse circumstances and by no means either in joyousness or security. Were these then the Messianic times which, it had been foretold, were to dawn at the close of their captivity? They did not at all events answer the expectations which had been formed. A settlement had been again obtained, it was true, in the fatherland; but the Persian yoke pressed now more heavily than ever the Babylonian had done. The sins of God's people seemed still unforgiven, their period of bond-service not yet at an end. A slight improvement, as is shown by the prophecies of Haggai and Zechariah, followed when in the year 520 the obstacles disappeared which until then had stood in the way of the rebuilding of the temple; the work then begun was completed in 516. Inasmuch as the Jews were now nothing more than a religious community, based upon the traditions of a national existence that had ceased, the rebuilding of the temple, naturally, was for them an event of supreme importance.

The law of the new theocracy was the book of Deuteronomy; this was the foundation on which the structure was to be built. But the force of circumstances, and the spirit of the age, had even before and during the exile exerted a modifying influence upon that legislative code; and it continued to do so still. At first a "son of David" had continued to stand at the head of the Bne haggola, but this last relic of the old monarchy soon had to give way to a Persian governor who was under the control of the satrap of trans-Euphratic Syria, and whose principal business was the collection of revenue. Thenceforward the sole national chief was Joshua the high priest, on whom, accordingly, the political representation also of the community naturally devolved. In the circumstances as they then were no other arrangement was possible. The way had been paved for it long before in so far as the Assyrians had destroyed the kingdom of Israel, while in the kingdom of Judah which survived it the religious cultus had greater importance attached to it than political affairs, and also inasmuch as in point of fact the practical issue of the prophetic reformation sketched in Deuteronomy had been to make the temple the national center still more than formerly. The hierocracy toward which Ezekiel had already opened the way was simply inevitable. It took the form of a monarchy of the high priest, he having stepped into the place formerly occupied by the theocratic king. As his peers and at his side stood the members of his clan, the Levites of the old Jerusalem, who traced their descent from Zadok (Sadduk); the common Levites held a much lower rank, so far as they had maintained their priestly rank at all, and had not been degraded, in accordance with Ezekiel's law, to the position of mere temple servitors. "Levite," once the title of honor bestowed on all priests, became more and more confined to members of the second order of the clergy.

Meanwhile no improvement was taking place in the condition of the Jewish colonists. They were poor; they had incurred the hostility of their neighbors by their exclusiveness; the Persian Government was suspicious; the incipient decline of the great kingdom was accompanied with specially unpleasant consequences so far as Palestine was concerned (Megabyzus). All this naturally tended to produce in the community a certain laxity and depression. To what purpose (it was asked) all this religious strictness, which led to so much that was unpleasant? Why all this zeal for Jehovah, who refused to be mollified by it? It is a significant fact that the upper ranks of the priesthood were least of all concerned to counteract this tendency. Their priesthood was less to them than the predominance which was based upon it; they looked upon the neighboring ethnarchs as their equals, and maintained relations of friendship with them. The general community was only following their example when it also began to mingle with the Amme haareç.

The danger of Judaism merging into heathenism was imminent. But it was averted by a new accession from without. In the year 458 Ezra the scribe, with a great number of his compatriots, set out from Babylon, for the purpose of reënforcing the Jewish element in Palestine. The Jews of Babylon were more happily situated than their Palestinian brethren, and it was comparatively easy for them to take up a separatist attitude, because they were surrounded by a heathenism not partial but entire. They were no great losers from the circumstance that they were precluded from participating directly in the life of the ecclesiastical community; the Torah had long ago become separated from the people, and was now an independent abstraction following a career of its own. Babylonia was the place where a further codification of the law had been placed alongside of Deuteronomy. Ezekiel had led the way in reducing to theory and to writing the sacred practice of his time; in this he was followed by an entire school; in their exile the Levites turned scribes. Since then Babylon continued to be the home of the Torah; and, while in Palestine itself the practice was becoming laxer, their literary study had gradually intensified the strictness and distinctive peculiarities of Judaism. And now there came to Palestine a Babylonian scribe having the law of his God in his hand, and armed with authority from the Persian king to proceed upon the basis of this law with a reformation of the community.

Ezra did not set about introducing the new law immediately on his arrival in Judæa. In the first instance he concentrated his attention on the task of effecting a strict separation between the Bne haggola and the heathen or half-heathen inhabitants. So much he could accomplish upon the basis of Deuteronomy, but it was long before he gave publicity to the law which he himself had brought. Why he hesitated so long it is impossible to say; between the seventh and the twentieth year of Artaxerxes Longimanus (458–445 B.C.) there is a great hiatus in the narrative of the books of Ezra and Nehemiah. The main reason appears to have been that, in spite of the good-will of the Persian king, Ezra had not the vigorous support of the local authorities. But this was indispensably necessary in order to secure recognition for a new law.

At last, in 445, it fell to the lot of a Jew, who also shared the views of Ezra, Nehemiah ben Hakkelejah, the cupbearer and the favorite of Artaxerxes, to be sent as Persian governor to Judæa. After he had freed the community from external pressure with vigor and success, and brought it into more tolerable outward circumstances, the business of introducing the new lawbook was next proceeded with; in this Ezra and Nehemiah plainly acted in concert.

On the first of Tisri—the year is unfortunately not given, but it cannot have been earlier than 444 B.C.—the promulgation of the law began at a great gathering in Jerusalem; Ezra, supported by the Levites, was present. Toward the end of the month, the concluding act took place, in which the community became solemnly bound by the contents of the law. Special prominence was given to those provisions with which the people were directly concerned, particularly those which related to the dues payable by the laity to the priests.

The covenant which hitherto had rested on Deuteronomy was thus expanded into a covenant based upon the entire Pentateuch. Substantially at least Ezra's lawbook, in the form in which it became the Magna Charta of Judaism in or about the year 444, must be regarded as practically identical with our Pentateuch, although many minor amendments and very considerable additions may have been made at a later date.

As regards the subsequent history of the Jewish community under the Persian domination, we have almost no information. The high priest in Nehemiah's time was Eliashib, son of Joiakim and grandson of Joshua, the patriarchal head of the sons of Zadok, who had returned from Babylon; he was succeeded in the direct line by Joiada, Johanan, and Jaddua; the last-named was in office at the time of Alexander the Great. Palestine was the province which suffered most severely of all from the storms which marked the last days of the sinking Persian empire, and it is hardly likely that the Jews escaped their force; we know definitely, however, of only one episode, in which the Persian general, Bagoses, interfered in a disagreeable controversy about the high-priesthood (*cir.* 375).

To this portion also belongs the constitution of the Samaritan community on an independent footing by Manasseh, a Jewish priest of rank. He was expelled from Jerusalem by Nehemiah in 432, for refusing to separate from his alien wife. He took shelter with his father-in-law, Sanballat, the Samaritan prince, who built him a temple on Mount Gerizim near Shechem, where he organized a Samaritan church and a Samaritan worship, on the Jerusalem model, and on the basis of a but slightly modified Jerusalem Pentateuch. If the Samaritans had hitherto exerted themselves to the utmost to obtain admission into the fellowship of the Jews, they henceforward were as averse to have anything to do with these as these were to have any dealings with them; the temple on Mount Gerizim was now the symbol of their independence as a distinct religious sect. For the Jews this was a great advantage, as they had no longer to dread the danger of syncretism. They could now quite confidently admit the Amme haareç into their communion, in the assurance of assimilating them without any risk of the opposite process taking place. The Judaizing process began first with the country districts immediately surrounding Jerusalem, and then extended to Galilee and many portions of Peræa. In connection with it, the Hebrew language, which hitherto had been firmly retained by the Bne haggola, now began to yield to the Aramaic, and to hold its own only as a sacred speech.

Palestine fell into Alexander's possession in 332; after his death it had an ample share of the troubles arising out of the partition of his inheritance. In 320 it was seized by Ptolemy I., who, on a sabbath day, took Jerusalem; but in 315 he had to give way before Antigonus. Even before the battle of Ipsus, however, he recovered possession once more, and for a century thereafter southern Syria continued to belong to the Egyptian crown, although the Seleucidæ more than once sought to wrench it away.

In the priestly dynasty during the period of the Ptolemies, Onias I. ben Jaddua was succeeded by his son Simon I., after whom again came first his brothers Eleazar and Manasseh, and next his son Onias II.; the last-named was in his turn followed by his son Simon II., whose praises are sung by the son of Sirach (xlix. 14-16). At the side of the high priest stood the gerusia of the town of Jerusalem, as a council of state, including the higher ranks of the priesthood. The new sovereign power was at once stronger and juster than the Persian—at least under the earlier Ptolemies; the power of the national government increased; to it was intrusted the business of raising the tribute.

As a consequence of the revolutionary changes which had taken place in the conditions of the whole East, the Jewish dispersion (diaspora) began vigorously to spread. It dated its beginning indeed from an earlier period—from the time when the Jews had lost their land and kingdom, but yet, thanks to their religion, could not part with their nationality. They did not by any means all return from Babylon; perhaps the majority permanently settled abroad. The successors of Alexander (diadochi) fully appreciated their international element, and used it as a link between their barbarian and Hellenic populations. Everywhere they encouraged the settlement of Jews—in Asia Minor, in Syria, and especially in Egypt. Alongside of the Palestinian there arose a Hellenistic Judaism, which had its metropolis in Alexandria. Here, under Ptolemy I. and II., the Torah had already been translated into Greek, and around this sprung up a Jewish Greek literature which soon became very extensive. At the court and in the army of the Ptolemies many Jews rose to prominent positions; everywhere they received the preference over, and everywhere they in consequence earned the hatred of, the indigenous population.

After the death of Ptolemy IV. (205) Antiochus III. attained the object toward which he and his predecessors had long been vainly striving; after a war protracted with varying success through several years, he succeeded at last in incorporating Palestine with the kingdom of the Seleucidæ. The Jews took his side, less perhaps because they had become disgusted with the really sadly degenerate Egyptian rule, than because they had foreseen the issue of the contest, and preferred to attach themselves voluntarily to the winning side. In grateful acknowledgment Antiochus confirmed and enlarged certain privileges of the "holy camp," *i.e.*, of Jerusalem. It soon, however, became manifest that the Jews had made but a poor bargain in this exchange. Three years after his defeat at Magnesia, Antiochus III. died (187), leaving to his son Seleucus IV. an immense burden of debt, which he had incurred by his unprosperous Roman war. Seleucus, in his straits, could not afford to be overscrupulous in appropriating money where it was to be found; he did not need to be twice told that the wealth of the temple at Jerusalem was out of all proportion to the expenses of the sacrificial service. The sacred treasury accordingly made the narrowest possible escape from being plundered; Heliodorus, who had been charged by the king to seize it, was deterred at the last moment by a heavenly vision. But the Jews derived no permanent advantage from this.

The malady which had long been incubating now reached its acute phase. Just in proportion as Hellenism showed itself friendly did it present elements of danger to Judaism. From the periphery it slowly advanced toward the center, from the diaspora to Jerusalem, from mere matters of external fashion to matters of the most profound conviction. Especially did the upper and cultivated classes of society begin to feel ashamed, in presence of the refined Greeks, of their Jewish singularity, and to do all in their power to tone it down and conceal it. In this the priestly nobility made itself conspicuous as the most secular section of the community, and it was the high priest who took the initiative in measures which aimed at a complete Hellenizing of the Jews. He outdid everyone else in paganism. Once he sent a considerable present for offerings to the Syrian Hercules on the occasion of his festival, but his messenger, ashamed to apply the money to such a purpose, set it apart for the construction of royal ships of war.

The friendship shown by Jason for the Greek king and for all that was Hellenic did not prevent Antiochus IV. from setting pecuniary considerations before all others. Menelaus, intrusted with the mission of conveying to Antioch the annual Jewish tribute, availed himself of the opportunity to promote his own personal interests by offering a higher sum for the high-priesthood, and, having otherwise ingratiated himself with the king, gained his object (171). But though nominated he did not find it quite easy to obtain possession of the post. The Tobiadæ took his side, but the body of the people stuck to Jason, who was compelled to give way only when Syrian troops had been brought upon the scene. Menelaus had immediately, however, to encounter another difficulty, for he could not at once pay the amount of tribute which he had promised. He helped himself so far indeed by robbing the temple, but this landed him in new embarrassments. Onias III., who was living out of employment at Antioch, threatened to make compromising revelations to the king; he was, however, opportunely assassinated. The rage of the people against the priestly temple-plunderer now broke out in a rising against a certain Lysimachus, who at the instance of the absent Menelaus had made further inroads upon the sacred treasury. The Jews' defense before the king (at Tyre) on account of this uproar resolved itself into a grievous complaint against the conduct of Menelaus. His case was a bad one, but money again helped him out of his straits, and the extreme penalty of the law fell upon his accusers.

The feelings of the Jews with reference to this wolfish shepherd may easily be imagined. Nothing but fear of Antiochus held them in check. Then a report gained currency that the king had perished in an expedition against Egypt (170), and Jason, who meanwhile had found refuge in Ammanitis, availed himself of the prevailing current of feeling to resume his authority with the help of 1,000 men. He was not able, however, to hold the position long, partly because he showed an unwise vindictiveness against his enemies, partly (and chiefly) because the rumor of the death of Antiochus turned out to be false. The king was already in fact close at hand, on his return from Egypt, full of anger at an insurrection which he regarded as having been directed against himself. He inflicted severe and bloody chastisement upon Jerusalem, carried off the treasures of the temple, and restored Menelaus, placing Syrian officials at his side. Jason fled from place to place, and ultimately died in misery at Lacedæmon.

The deepest despondency pravailed in Judæa; but its cup of sorrow was not yet full. Antiochus, probably soon after his last Egyptian expedition (168), sent Apollonius with an army against Jerusalem. He fell upon the unsuspecting city, disarmed the inhabitants and demolished the walls, but on the other hand fortified Acra, and garrisoned it strongly so as to make it a standing menace to the whole country. Having thus made his preparations, he proceeded to carry out his main instructions. All that was religiously distinctive of Judaism was to be removed; such was the will of the king. The Mosaic cultus was abolished, Sabbath observance and the rite of circumcision prohibited, all copies of the Torah confiscated and burnt. In the desecrated and partially destroyed temple pagan ceremonies were performed, and upon the great altar of burnt offering a small altar to Jupiter Capitolinus was erected, on which the first offering was made on Kislev 25, 168. In the country towns also heathen altars were erected, and the Jews compelled, on pain of death, publicly to adore the false gods and to eat swine's flesh that had been sacrificed to idols.

The princes and grandees of the Jews had represented to Antiochus that the people were ripe for Hellenization; and inasmuch as, apart from this, to reduce to uniformity the extremely motley constituents of his kingdom was a scheme that lay near his heart, he was very willing to believe them. That the very opposite was the case must of course have become quite evident very soon; but, the resistance of the Jews taking the form of rebellious risings against his creatures, he fell upon the hopeless plan of coërcion—hopeless, for he could attain his end only by making all Judæa one vast graveyard. There existed indeed a pagan party; the Syrian garrison of Acra was partly composed of Jews who sold themselves to be the executioners of their countrymen. Fear also influenced many to deny their convictions; but the majority adhered firmly to the religion of their fathers. Jerusalem, the center of the process of Hellenization, was abandoned by its inhabitants, who made their escape to Egypt, or hid themselves in the country, in deserts and caves. The scribes in especial held fast by the law; and they were joined by the party of the Asidæans (*i.e.*, pious ones).

At first there was no thought of meeting violence with violence; as the book of Daniel shows, people consoled themselves with thoughts of the immediate intervention of God which would occur in due time. Quite casually, without either plan or concert, a warlike opposition arose. There was a certain priest Mattathias, of the family of the Hasmonæans, a man far advanced in life, whose home was in Modein, a little country town to the west of Jerusalem. Hither also the Syrian soldiers came to put the population to a positive proof of their change of faith; they insisted upon Mattathias leading the way. But he was steadfast in his refusal; and, when another Jew addressed himself before his eyes to the work of making the heathen offering, he killed him and the Syrian officer as well, and destroyed the altar. Thereupon he fled to the hill country, accompanied by his sons (Johannes Gaddi, Simon Thassi, Judas Maccabæus, Eleazar Auaran, Jonathan Apphus) and other followers. But he resolved to defend himself to the last, and not to act as some other fugitives had done, who, about the same time, had allowed themselves to be surrounded and butchered on a sabbath day without lifting a finger. Thus he became the head of a band which defended the ancestral religion with the sword. They traversed the country, demolished the altars of the false gods, circumcised the children, and persecuted the heathen and heathenishly disposed. The sect of the Asidæans also intrusted itself to their warlike protection.

Mattathias soon died and left his leadership to Judas Maccabæus, by whom the struggle was carried on in the first instance after the old fashion; soon, however, it assumed larger dimensions, when regular armies were sent out against the insurgents. First Apollonius, the governor of Judæa, took the field; but he was defeated and fell in battle. Next came Seron, governor of Cœlesyria, who also was routed, near Bethhoron (166). Upon this Lysias, the regent to whom Antiochus IV., who was busied in the far east, had intrusted the government of Syria and the charge of his son, Antiochus Philopator, a minor, sent a strong force under the command of three generals. Approaching from the west, it was their design to advance separately upon Jerusalem, but Judas anticipated their plan and compelled them to quit the field (166). The regent now felt himself called on to interpose in person. Invading Judæa from the south, he encountered the Jews at Bethsur, who, however, offered an opposition that was not easily overcome; he was prevented from resorting to the last measures by the intelligence which reached him of the death of the king Elymais (165).

The withdrawal of Lysias secured the fulfillment of the desires of the defenders of the faith in so far as it now enabled them to restore the Jerusalem worship to its previous condition. They lost no time in setting about the accomplishment of this. They were not successful indeed in wresting Acra from the possession of the Syrians, but they so occupied the garrison as to prevent it from interfering with the work of restoration. On Kislev 25, 165, the very day on which, three years before, "the abomination of desolation" had been inaugurated, the first sacrifice was offered on the new altar, and in commemoration of this the feast of the dedication was thenceforth celebrated.

As it was easy to see that danger still impended, the temple was put into a state of defense, as also was the town of Bethsur, where Lysias had been checked. But the favorable moment presented by the change of sovereign was made use of for still bolder attempts. Scattered over the whole of southern Syria there were a number of Jewish localities on which the heathens now proceeded to wreak their vengeance. For the purpose of rescuing these oppressed co-religionists, and of bringing them in safety to Judæa, the Maccabees made a series of excursions extending in some cases as far as to Lebanon and Damascus. Lysias had his hands otherwise fully occupied, and perhaps did not feel much disposed to continue the fight on behalf of the cultus of Jupiter Capitolinus. Daily gaining in boldness, the Jews now took in hand also to lay regular siege to Acra. Then, at last, Lysias yielded to the pressure of Syrian and Jewish deputations and determined to take serious steps (162). With a large force he entered Judæa, again from the south, and laid siege to Bethsur. Judas vainly attempted the relief of the fortress; he sustained near Bethzachariah a defeat, in which his brother Eleazar perished. Bethsur was unable to hold out, being short of provisions on account of the sabbatic year. The Syrians advanced next to Jerusalem, and besieged the temple; it also was insufficiently provisioned, and would soon have been compelled to surrender had not Lysias been again called away at the critical moment by other exigencies. A certain Philip was endeavoring to oust him from the regency; as it was necessary for him to have his hands free in dealing with this new enemy, he closed a treaty with the temple garrison and the people at large, in accordance with which at once the political subjection and the religious freedom of the Jews were to be maintained. Thus the situation as it had existed before Antiochus IV. was restored. Only no attempt was made to replace Menelaus as high priest and ethnarch; this post was to be filled by Alcimus.

The concessions thus made by Lysias were inevitable; and even King Demetrius I., son of Seleucus IV., who toward the end of 162 ascended the throne and caused both Lysias and his ward to be put to death, had no thought of interfering wlth their religious freedom. But the Maccabees desired something more the *status quo ante;* after having done their duty they were disinclined to retire in favor of Alcimus, whose sole claim lay in his descent from the old heathenishly-disposed high-priestly family. Alcimus was compelled to invoke the assistance of the king, who caused him to be installed by Bacchides. He was at once recognized by the Scribes and Asidæans, for whom, with religious liberty, everything they wished had been secured; the claims to supremacy made by the Hasmonæans were of no consequence to them. Doubtless the masses also would ultimately have quietly accepted Alcimus, who of course refrained from interference with either law or worship, had he not abused the momentary power he derived from the presence of Bacchides to take a foolish revenge. But the consequence of his action was that, as soon as Bacchides had turned his back, Alcimus was compelled to follow him. For the purpose of restoring him a Syrian army once more invaded Judæa under Nicanor (160), but first at Kapharsalama and afterward at Bethoron was defeated by Judas and almost annihilated in the subsequent flight, Nicanor himself being among the slain (thirteenth Adar—Nicanor's day). Judas was now at the acme of his prosperity; about this time he concluded his (profitless) treaty with the Romans. But disaster was impending. In the month of Nisan, barely a month after the defeat of Nicanor, a new Syrian army under Bacchides entered Judæa from the north; near Elasa, southward from Jerusalem, a decisive battle was fought which was lost by Judas, and in which he himself fell.

The religious war properly so called had already been brought once for all to an end by the convention of Lysias. If the struggle continued to be carried on, it was not for the faith but for the supremacy—less in the interests of the community than in those of the Hasmonæans. After the death of Judas the secular character which the conflict had assumed ever since 162 continually became more conspicuous. Jonathan Apphus fought for his house, and in doing so used thoroughly worldly means. The high-priesthood, *i.e.*, the ethnarchy, was the goal of his ambition. So long as Alcimus lived, it was far from his reach. Confined to the rocky fastnesses beside the Dead Sea, he had nothing for it but, surrounded by his faithful followers, to wait for better times. But on the death of Alcimus (159) the Syrians refrained from appointing a successor, to obviate the necessity of always having to protect him with military force. During the interregnum of seven years which followed Jonathan again came more and more to the front, so that at last Bacchides concluded an armistice with him on the basis of the *status quo* (I Macc. ix. 73). From his residence at Michmas Jonathan now exercised a *de facto* authority over the entire nation.

When, accordingly, Alexander Balas, a reputed son of Antiochus IV., rose against Demetrius, both rivals exerted themselves to secure the alliance of Jonathan, who did not fail to benefit by their competition. First of all, Demetrius formally recognized him as a prince of Judah; in consequence of this he removed to Jerusalem, and expelled the heathen and heathenishly disposed, who continued to maintain a footing only in Acra and Bethsur. Next, Alexander Balas conferred on him the title of "high priest of the nation and friend of the king;" in gratitude for which Jonathan went over to his side (152). He remained loyal, although Demetrius now made larger offers; he was justified by the event, for Demetrius I. had the worst of it and was slain (150). The victorious Balas heaped honors upon Jonathan, who maintained his fidelity, and fought successfully in his interests when, in 147, Demetrius II., the son of Demetrius I., challenged a conflict. The high priest was unable indeed to prevent the downfall of Alexander in 145; but Demetrius II., won by presents, far from showing any hostility, confirmed him in his position in consideration of a tribute of 300 talents.

Jonathan was grateful to the king, as he showed by going with 3,000 men to his aid against the insurgent Antiochenes. But when the latter drew back from his promise to withdraw the garrison from Acra, he went over to the side of Trypho, who had set up a son of Alexander Balas (Antiochus) as a rival. In the war which he now waged as Seleucid strategus against Demetrius he succeeded in subduing almost the whole of Palestine. Meanwhile his brother Simon remained behind in Judæa, mastered the fortress of Bethsur, and resumed with great energy the siege of Acra. All this was done in the names of Antiochus and Trypho, but really of course in the interests of the Jews themselves. There were concluded also treaties with the Romans and Lacedæmonians, certainly not to the advantage of the Syrians.

Trypho sought now to get rid of the man whom he himself had made so powerful. He treacherously seized and imprisoned Jonathan in Ptolemais, and meditated an attack upon the leaderless country. But, on the frontier, Simon, the last remaining son of Mattathias, met him in force. All Trypho's efforts to break through proved futile; after skirting all Judæa from west to south, without being able to get clear of Simon, he at last withdrew to Peræa without having accomplished anything. On the person of Jonathan, whom he caused to be executed, he vented the spleen he felt on the discovery that the cause for which that prince had fought was able to gain the victory, even when deprived of his help. Simon, in point of fact, was Jonathan's equal as a soldier, and his superior as a ruler. He secured his frontier by means of fortresses, made himself master of Acra (141), and understood how to enable the people, in time of peace, to reap the advantages that result from successful war; agriculture, industry, and commerce (from the haven of Joppa) began to flourish vigorously. In grateful recognition of his services, the high-priesthood and the ethnarchy were bestowed upon him as hereditary possessions by a solemn assembly of the people, "until a trustworthy prophet should arise."

Nominally, the Selucidæ still continued to possess the suzerainty. Simon, naturally, had detached himself from Trypho and turned to Demetrius II., who confirmed him in his position, remitted all arrears of tribute, and waived his rights for the future (142). The friendship of Demetrius II. and of his successor, Antiochus

Sidetes, with Simon, however, lasted only as long as Trypho remained in the way. But, he once removed, Sidetes altered his policy. He demanded of Simon the surrender of Joppa, Gazara, and other towns, besides the citadel of Jerusalem, as well as payment of all tribute resting due. The refusal of these demands led to war, which, in its earlier stages, was carried on with success, but the scales were turned after the murder of Simon, when Sidetes in person took the field against John Hyrcanus, Simon's son and successor. Jerusalem capitulated; in the negotiations for peace, the surrender of all the external possessions of the Jews was insisted upon; the suzerainty of the Syrians became once more a reality (135). But in 130 the powerful Antiochus Sidetes fell in an expedition against the Parthians, and the complications anew arising in reference to the succession to the Syrian throne placed Hyrcanus in a position to recover what he had lost and to make new acquisitions. He subjugated Samaria and Idumæa, compelling the inhabitants of the latter to accept circumcision. Like his predecessors, he, too, sought to secure the favor of the Romans, but derived no greater benefit from the effort than they had done. After a prosperous reign of thirty years he died in 105. By Josephus he is represented as a pattern of all that a pious prince ought to be; by the rabbins as representing a splendid high-priesthood. The darkness of the succeeding age lent a brighter color to his image.

The external splendor of the Hasmonæan kingdom did not at once die away—the downfall of the Selucidæ, which was its negative condition, being also a slow affair. Judah Aristobulus, the son of Hyrcanus, who reigned for only one year, was the first to assume the Greek title of royalty; Ituræ was subdued by him, and circumcision forced upon the inhabitants. His brother Jonathan (Jannæus) Alexander (104–79), in a series of continual wars, which were never very prosperous, nevertheless succeeded in adding the whole coast of Philistia (Gaza) as well as a great portion of Peræa to his hereditary dominions. But the external enlargement of the structure was secured at the cost of its internal consistency.

On one occasion, when Alexander Jannæus had returned to Jerusalem at the feast of tabernacles, and was standing in his priestly vestments before the altar to sacrifice, he was pelted by the assembled crowd of worshipers with citrons from the green branches they carried. By the cruelty with which he punished this insult he excited the populace to the highest pitch, and, when he lost his army in the disaster of Gadara, rebellion broke out. The Pharisees summoned the Syrian king, Demetrius Eucærus; Jannæus was worsted, and fled into the desert. But, as he wandered in helplessness there, the patriotism of the people and sympathy for the heir of the Maccabees suddenly awoke; nature proved itself stronger than that consistency which, in the cause of the Divine honor, had not shrunk from treason. The insurgents, for the most part, went over to the side of the fugitive king; the others he ultimately overpowered after a struggle which lasted through several years, Demetrius having withdrawn his intervention. The vengeance which he took on the Pharisees was a bloody one; their only escape was by voluntary exile. Thenceforward he had peace so far as they were concerned. His last years were occupied with the reacquisition of the conquests which he had been compelled to yield to the Arabs during the civil war. He died in the field at the siege of Ragaba in Peræa (79).

Under Queen Salome, his widow, matters were as if they had been specially arranged for the satisfaction of the Pharisees. The high-priesthood passed to Salome's son Hyrcanus II.; she herself was only queen. In the management of external affairs her authority was absolute; in home policy she permitted the Scribes to wield a paramount influence. The common assertion indeed that the synedrium was at that time practically composed of Scribes is inconsistent with the known facts of the case; the synedrium at that time was a political and not a scholastic authority. In its origin it was the municipal council of Jerusalem, but its authority extended over the entire Jewish community; alongside of the elders of the city the ruling priests were those who had the greatest number of seats and votes. John Hyrcanus appears to have been the first to introduce some Scribes into its composition; it is possible that Salome may have increased their number, but even so this high court was far from being changed into a college of Scribes like that at Jamnia. If the domination of the Pharisees at this time is spoken of, the expression cannot be understood as meaning that they already held all the public offices, but only at most that the holders of those offices found it necessary to administer and to judge in their spirit and according to their fundamental principles.

The party of the Sadducees (consisting of the old Hasmonæan officers and officials, who were of priestly family indeed, but attached only slight importance to their priestly functions) at length lost all patience. Led by Aristobulus, the second son of Jannæus, the leaders of the party came to the palace, and begged the queen to dismiss them from the court and to send them into the provinces. There they were successful in securing possession of several fortresses in preparation for insurrection, a favorable opportunity for which they were watching. Such an opportunity occurred, it seemed to Aristobulus, as his mother lay on her death-bed. The commandants of the fortresses were at his orders, and by their assistance an army also, with which he accordingly advanced upon Jerusalem, and, on the death of Salome, made himself master of the situation (69). Hyrcanus was compelled to resign office. With this event the good understanding between the civil government and the Pharisees came to an end; the old antagonisms became active once more, and now began to operate for the advantage of a third party, the Idumæan Antipater, Hyrcanus' confidential friend.

After the latter, aided by Antipater, had at length, with great difficulty, got himself into a position for asserting his rights against Aristobulus, the Pharisees could not do otherwise than rank themselves upon his side, and the masses joined them against the usurper. With the help of the Nabatæan monarch the effort to restore the elder brother to the supreme authority would doubtless have succeeded, had not the Romans procured relief for Aristobulus, besieged as he was in Jerusalem (65), though without thereby recognizing his claims. Pompey continued to delay a decision on the controversy in 64 also when the rival claimants presented themselves before him at Damascus; he wished first to have the Nabatæans disposed of, and to have free access to them through Judæa. This hesitation roused the suspicion of Aristobulus; still he did not venture to take decisive action upon them. He closed the passes (to Mount Ephraim) against the Romans, but afterward gave them up; he prepared Jerusalem for war, and then went in person to the Roman camp at Jericho, where he promised to open the gates of the city and also to pay a sum of money. But the Roman ambassadors found the gates barred, and had to return empty-handed. Aristobulus thereupon was arrested, and seige was laid to Jerusalem. The party of Hyrcanus, as soon as it had gained the upper hand, surrendered the town; but the supporters of Aristobulus took their stand in the temple and defended it obstinately. In June, 63, the place was carried by storm; Pompey personally inspected the Holy of Holies, but otherwise spared the religious feelings of the Jews. But he caused the chief promoters of the war to be executed, and carried Aristobulus and his family into captivity. He abolished the kingship, but restored the high-priestly dignity to Hyrcanus. The territory was materially reduced in area, and made tributary to the Romans; the city was occupied by a Roman garrison.

Henceforward Roman intervention forms a constant disturbing factor in Jewish history. The struggle between the Pharisees and the Sadducees continued indeed to be carried on, but only because the momentum of their old feud was not yet exhausted. The Pharisees in a sense had been victorious. While the two brothers were pleading their rival claims before Pompey, ambassadors from the Pharisees had made their appearance in Damascus to petition for the abolition of the kingship; this object had now to some extent been gained. Less ambiguous than the victory of the Pharisees was the fall of the Sadducees, who in losing the sovereignty of the Jewish state lost all real importance. But the intervention of the foreign element exercised its most powerful influence upon the temper of the lower classes. Though in times of peace the masses still continued to accept the guidance of the rabbins, their patriotism instantly burst into flame as soon as a pretender to the throne, belonging to the family of Aristobulus, appeared in Palestine. During the decennia which immediately followed, Jewish history was practically absorbed in vain attempts to restore the old Hasmonæan kingdom. Insurrections of steadily increasing dimensions were made in favor of Aristobulus, the representative of the national cause. For Hyrcanus was not regarded as a Hasmonæan at all, but merely as the creature of Antipater and the Romans. First, in the year 57, Alexander the son of Aristobulus broke into rebellion, then in 56 Aristobulus himself and his son Antigonus, and in 55 Alexander again. Antipater was never able to hold his own; Roman intervention was in every case necessary. The division of the Hasmonæan state into five "aristocracies" by Gabinius had no effect in diminishing the feeling of national unity cherished by the Jews of Palestine. Once again, after the battle of Carrhæ, a rising took place, which Cassius speedily repressed.

In 49 the great Roman civil war broke out; Cæsar instigated Aristobulus against Antipater, who in common with the whole East had espoused the cause of Pompey. But Aristobulus was poisoned by the opposite party while yet in Italy, and about the same time his son Alexander was also put to death at Antioch; thus the danger to Antipater passed away. After the battle of Pharsalus he went over to Cæsar's side, and soon after rendered him an important service by helping him out of his difficulties at Alexandria. By this means he earned the good will of Cæsar toward the whole body of the Jews, and secured for himself (or Hyrcanus) a great extension of power and of territory. The five "synedria" or "aristocracies" of Gabinius were superseded, the most important conquests of the Hasmonæans restored, the walls of Jerusalem, which Pompey had razed, rebuilt.

However indisputable the advantages conferred by the rule of Antipater, the Jews could not forget that the Idumæan, in name of Hyrcanus the rightful heir of the Hasmonæans, was in truth setting up an authority of his own. The Sadducæan aristocracy in particular, which formerly in the synedrium had shared the supreme power with the high priest, endeavored to restore reality once more to the nominal ascendancy, which still continued to be attributed to the ethnarch and the synedrium. "When the authorities of the Jews saw how the power of Antipater and his sons was growing, their disposition toward him became hostile." They were specially jealous of the youthful Herod, to whom Galilee had been intrusted by his father. On account of the arbitrary execution of a robber chief Ezechias, who perhaps had originally been a Hasmonæan partisan, they summoned him before the synedrium, under the impression that it was not yet too late to remind him that he was after all but a servant. But the defiant demeanor of the culprit, and a threatening missive which at the same time arrived from Sextus Cæsar demanding his acquittal, rendered his judges speechless, nor did they regain their courage until they had heard the stinging reproaches of Sameas the Scribe. Yet the aged Hyrcanus, who did not comprehend the danger that was threatening himself, postponed judgment upon Herod, and gave him opportunity to withdraw. Having been appointed strategus of Cœlesyria by Sextus Cæsar in the meanwhile, he soon afterward appeared before Jerusalem at the head of an army, and the authorities were compelled to address themselves in a conciliatory manner to his father and to Phasael his brother in order to secure his withdrawal.

The attempt to crush the serpent which had thus effected a lodgment in the Hasmonæan house came too late. The result of it simply was that the Herodians had now the advantage of being able to distinguish between Hyrcanus and his "evil counselors." From that moment the downfall of the Sadducæan notables was certain. It was of no avail to them that after the battle of Philippi (42) they accused Herod and Phasael (Antipater having been murdered in 43) before Antony of having been helpful in every possible way to Cassius; Antony declared himself in the most decisive manner for the two brothers. In their despair—for properly speaking they were not national fanatics, but only egoistic politicians—they ultimately made common cause with Antigonus the son of Aristobulus, and threw themselves into the arms of the Parthians, perceiving the interests of the Romans and of Herod to be inseparable (40). Fortune at first seemed to have declared in favor of the pretender. The masses unanimously took his side; Phasael committed suicide in prison; with a single blow Herod was stripped of all his following and made a helpless fugitive. He took refuge in Rome, however, where he was named king of Judæa by the senate, and after a somewhat protracted war he finally, with the help of the legions of Sosius, made himself master of Jerusalem (37). The captive Antigonus was beheaded at Antioch.

King Herod began his reign by reorganizing the synedrium; he ordered the execution of forty-five of its noblest members, his most zealous opponents. These were the Sadducæan notables who long had headed the struggle against the Idumæan interlopers. Having thus made away with the leaders of the Jerusalem aristocracy, he directed his efforts to the business of corrupting the rest. He appointed to the most important posts obscure individuals, of priestly descent, from Babylon and Alexandria, and thus replaced with creatures of his own the old aristocracy. Nor did he rest content with this; in order to preclude the possibility of any independent authority ever arising alongside of his own, he abolished the life tenure of the high-priestly office, and brought it completely under the control of the secular power. By this means he succeeded in relegating the Sadducees to utter insignificance. They were driven out of their native sphere—the political—into the region of theoretical and ecclesiastical discussion, where they continued, but on quite unequal terms, their old dispute with the Pharisees.

It was during the period of Herod's activity that the Pharisees, strictly speaking, enjoyed their greatest prosperity; in the synedrium they became so numerous as almost to equal the priests and elders. Quite consistently with their principles they had abstained from taking any part in the life-and-death struggle for the existence of the national state. Their leaders had even counseled the fanatical defenders of Jerusalem to open the gates to the enemy; for this service they were treated with the highest honor by Herod. He made it part of his general policy to favor the Pharisees (as also the sect of the Essenes, insignificant though it was), it being his purpose to restrict the national life again within those purely ecclesiastical channels of activity which it had abandoned since the Maccabæan wars. However reckless his conduct in other respects, he was always scrupulously careful to avoid wounding religious susceptibilities. But although the Pharisees might be quite pleased that the high-priesthood and the kingship were no longer united in one and the same person, and that interest in the law again overshadowed interest in politics, the populace for their part could never forgive Herod for overthrowing the old dynasty. That he himself, at least in religious profession, was a Jew did not improve his position, but rather made it worse. It was not easy for him to stifle the national feeling after it had once been revived among the Jews; they could not forget the recent past, and objected to being thrust back into the time when foreign domination was endured by them as a matter of course. The Romans were regarded in quite a different light from that in which the Persians and the Greeks had been viewed, and Herod was only the client of the Romans.

His greatest danger seemed to arise from the still surviving members of the Hasmonæan family, to whom, as is easily understood, the national hopes clung. In the course of the earlier years of his reign he removed every one of them from his path, beginning with his youthful brother-in-law Aristobulus (35), after whom came his old patron Hyrcanus II. (30), then Mariamne his wife (29), and finally his stepmother Alexandra (28), the daughter of Hyrcanus and the widow of Alexander Aristobuli. Subsequently, in 25, he caused Costobarus and the sons of Babas to be executed. While thus occupied with domestic affairs, Herod had constant trouble also in his external relations, and each new phase in his political position immediately made itself felt at home. In the first instance he had much to suffer from Cleopatra, who would willingly have seen Palestine reduced under Egyptian domination once more, and who actually succeeded in inducing Antony to take from Herod several fair and valuable provinces of his realm. Next, his whole position was imperiled by the result of the battle of Actium; he had once more ranged himself upon the wrong side. But his tact did not fail him in winning Octavianus, as before it had made Antony his friend. In fact he reaped nothing but advantage from the great overturn which took place in Roman affairs; it rid him of Cleopatra, a dangerous enemy, and gave him in the new imperator a much better master than before.

During the following years he had leisure to carry out those splendid works of peace by which it was his aim to ingratiate himself with the emperor. He founded cities and harbors (Antipatris, Cæsarea), constructed roads, theaters, and temples, and subsidized far beyond his frontier all works of public utility. He taxed the Jews heavily, but in compensation promoted their material interests with energy and discretion, and built for them, from 20 or 19 B.C., onward, the temple at Jerusalem. To gain their sympathies he well knew to be impossible. Apart from the Roman legions at his back his authority had its main supports in his fortresses and in his system of espionage.

But just as the acme of his splendor had been reached, he himself became the instrument of a terrible vengeance for the crimes by which his previous years had been stained; as executioner of all the Hasmonæans, he was now constrained to be the executioner of his own children also. His suspicious temper had been aroused against his now grown-up sons by Mariamne, whose claim through their mother to the throne were superior to his own; his brother Pheroras and his sister Salome made it their special business to fan his jealousy into flame. To show the two somewhat arrogant youths that the succession was not so absolutely secure in their favor as they were supposing, the father summoned to his court Antipater, the exiled son of a former marriage. Antipater, under the mask of friendship, immediately began to carry on infamous intrigues against his half-brothers, in which Pheroras and Salome unconsciously played into his hands. For years he persevered alike in favoring and unfavoring circumstances with his part, until, at last, by the machinations of a Lacedæmonian Eurycles, who had been bribed, Herod was induced to condemn the sons of Mariamne at Berytus, and cause them to be strangled, (Samaria, 7–6 B.C.) Not long afterward a difference between Antipater and Salome led to the exposure of the former. Herod was compelled to drain the cup to the dregs; he was not spared the knowledge that he had murdered his children without a cause. His remorse threw him into a serious illness, in which his strong constitution wrestled long with death. While he lay at Jericho near his end he gave orders for the execution of Antipater also; and to embitter the joy of the Jews at his removal he caused their elders to be shut up together in the hippodrome at Jericho, with the injunction to butcher them as soon as he breathed his last, that so there might be sorrow throughout the land. The latter order, however, was not carried out.

His death (4 B.C.) gave the signal for an insurrection of small beginnings which gradually spread until it ultimately infected all the people; it was repressed by Varus with great cruelty. Meanwhile Herod's connections were at Rome disputing about the inheritance. The deceased king (who was survived by several children of various marriages) had made a will, which was substantially confirmed by Augustus. By it his son Philip received the northern portion of the territory on the east of the Jordan along with the district of Paneas (Cæsarea Philippi); his thirty-seven years' reign over this region was happy. Another son, Herod Antipas, obtained Galilee and Peræa; he beautified his domains with architectural works (Sepphoris, Tiberias; Livias, Machærus), and succeeded by his fox-like policy in ingratiating himself with the emperors, particularly with Tiberius, for that very cause, however, becoming odious to the Roman provincial officials. The principal heir was Archelaus, to whom Idumæa, Judæa, and Samaritis were allotted; Augustus at first refused him the title of king. Archelaus had experienced the greatest difficulty in carrying through his claims before the emperor in face of the manifold oppositions of his enemies; the vengeance which he wreaked upon his subjects was so severe that in 6 A.D. a Jewish and Samaritan embassy besought the emperor for his deposition. Augustus assented, banishing Archelaus to Vienne, and putting in his place a Roman procurator. Thenceforward Judæa continued under procurators, with the exception of a brief interval (41–44 A.D.) during which Herod Agrippa I. united under his sway all the dominions of his grandfather.

The termination of the vassal kingship resulted in manifest advantage to the Sadducees. The high priest and synedrium again acquired political importance; they were the responsible representatives of the nation in presence of the suzerain power, and conceived themselves to be in some sort lords of land and people (John xi. 48). For the Pharisees the new state of affairs appears to have been less satisfactory. That the Romans were much less oppressive to the Jews than the rulers of the house of Herod was a consideration of less importance to them than the fact that the heathen first unintentionally and then deliberately were guilty of the rudest outrages upon the law, outrages against which those sly half-Jews had well understood how to be on their guard. It was among the lower ranks of the people, however, that hatred to the Romans had its proper seat. On the basis of the views and tendencies which had long prevailed there, a new party was now formed, that of the Zealots, which did not, like the Pharisees, aim merely at the fulfillment of all righteousness, *i.e.*, of the law, and leave everything else in the hands of God, but was determined to take an active part in bringing about the realization of the kingdom of God.

As the transition to the new order of things was going on, the census of Quirinius took place (6–7 A.D.); it occasioned an immense excitement, which, however, was successfully allayed. On the withdrawal of Quirinius, Coponius remained behind as procurator of Judæa; he was followed, under Augustus, by Marcus Ambivius and Annius Rufus; under Tiberius, by Valerius Gratus (15–26 A.D.) and Pontius Pilatus (26–36 A.D.); under Caligula, by Marcellus (36–37), and Marullus, (37–41 A.D.) The procurators were subordinate to the imperial legati of Syria; they resided in Cæsarea, and visited Jerusalem on special occasions only. They had command of the military, and their chief business was the maintenance of the peace and the care of the revenue. They interested themselves in affairs of religion only in so far as these had a political side; the temple citadel Antonia was constantly garrisoned with a cohort. The administration of justice appears to have been left to a very considerable extent in the hands of the synedrium, but it was not allowed to give effect to any capital sentence. At the head of the native authorities stood at this time not so much the actual high priest as the college of the chief priests. The actual office of high priest had lost its political importance in consequence of the frequency with which its holders were changed; thus, for example, Annas had more influence than Caiaphas.

The principle of interfering as little as possible with the religious liberty of the Jews was rudely assailed by the emperor Caius, who, like a second Antiochus, after various minor vexations, gave orders that his image should be set up in the temple of Jerusalem as in others elsewhere. It was entirely through the courage and tact of the Syrian governor P. Petronius that the execution of these orders was temporarily postponed until the emperor was induced by Agrippa I. to withdraw them. Caius soon afterward died, and under the rule of Agrippa I., to whom the government of the entire kingdom of his grandfather was committed by Claudius, the Jews enjoyed much prosperity; in every respect the king was all they could wish. This very prosperity seems, however, to have caused them fresh danger. For it made them feel the government by procurators, which was resumed after the death of Agrippa I., to be particularly hard to bear, whatever the individual characters of these might be. They were Cuspius Fadus (from 44, under whom Theudas), Tiberius Alexander (the Romanized nephew of Philo, till 48), Cumanus (48–52, under whom the volcano already began to give dangerous signs of activity), and Felix (52–60). Felix, who has the honor to be pilloried in the pages of Tacitus, contrived to make the dispeace permanent. The influence of the two older parties, both of which were equally interested in the maintenance of the existing order, and in that interest were being drawn nearer to each other, diminished day by day. The masses broke loose completely from the authority of the scribes; the ruling nobility adapted itself better to the times; under the circumstances which then prevailed, it is not surprising that they became thoroughly secular and did not shrink from the employment of directly immoral means for the attainment of their ends. The Zealots became the dominant party. It was a combination of noble and base elements; superstitious enthusiasts and political assassins, the so-called sicarii, were conjoined with honest but fanatical patriots. Felix favored the sicarii in order that he might utilize them; against the others his hostility raged with indiscriminating cruelty, yet without being able to check them. The anarchy which he left behind him as a legacy was beyond the control of his able successor Porcius Festus (60–62), and the last two procurators, Albinus (62–64) and Gessius Florus, acted as if it had been their special business to encourage and promote it. All the bonds of social order were dissolved; no property was secure; the assassins alone prospered, and the procurators went shares with them in the profits.

It was inevitable that deep resentment against the Romans should be felt in every honest heart. At last it found expression. During his visit to Jerusalem in May, 66, Florus laid hands upon the temple treasure; the Jews allowed themselves to go so far as to make a joke about it, which he avenged by giving over a portion of the city to be plundered, and crucifying a number of the inhabitants. He next insisted upon their kissing the rod, ordering that a body of troops which was approaching should be met and welcomed. At the persuasion of their leaders the Jews forced themselves even to this; but a constant succession of fresh insults and cruelties followed, till patience was quite exhausted at last, and in a violent street fight the Romans were so handled that the procurator withdrew from the town, leaving only a cohort in Antonia. Once again was an attempt at pacification made by Agrippa II., who hastened from Alexandria with this purpose, but the Jews could not bring themselves to make submission to Gessius Florus. It so happened that at this juncture the fortress of Masada on the Dead Sea fell into the hands of the Zealots; the courage of the party of action rose, and at the instance of the hot-headed Eleazer the son of Ananias, a man, still young, of highest priestly family, the sacrifice on behalf of the emperor was discontinued, *i.e.*, revolt was declared. But the native authorities continued opposed to a war. At their request King Agrippa sent soldiers to Jerusalem; at first they appeared to have some effect, but ultimately they were glad to make their escape in safety from the city. The cohort in Antonia was in like manner unable to hold its own; freedom was given it to withdraw; but, contrary to the terms of capitulation, it was put to the sword. The war party now signalized its triumph over all elements of opposition from within by the murder of the high priest Ananias.

A triumph was gained also over the outer foe. The Syrian legate, Cestius Gallus, appeared before Jerusalem in the autumn of 66, but after a short period raised the siege; his deliberate withdrawal was changed into a precipitate flight in an attack made by the Jews at Bethhoron. The revolt now spread irresistibly through all ranks and classes of the population, and the aristocracy found it expedient itself to assume the leadership. An autonomous government was organized, with the noblest members of the community at its head; of these the most important was the high priest Ananus.

Meanwhile Nero intrusted the conduct of the Jewish war to Vespasian, his best general. In the spring o he began his task in Galilee, where the historian Josephus had command of the insurgents. The Jews entirely distrusted him and he them; in a short time the Romans were masters of Galilee, only a few strong places holding out against them. Josephus was besieged in Jotapata, and taken prisoner; the other places also were unable to hold out long. Such of the champions of freedom in Galilee as escaped betook themselves to Jerusalem; among these was the Zealot leader John of Giscala. There they told the story of their misfortunes, of which they laid the blame upon Josephus, and upon the aristocratic government as having no heart for the common cause and having treachery for their motto. The Zealots now openly aimed at the overthrow of the existing government, but Ananus bravely withstood them, and pressed so hard on them that they summoned the Idumæans into the city to their aid. These honorable fanatics indeed withdrew again as soon as they had discovered that they were being used for sinister designs; but in the meanwhile they had accomplished the work of the Zealots. The old magistracy of Jerusalem was destroyed, Ananus with the heads of the aristocracy and very many other respectable citizens put to death. The radicals, for the most part not natives of the city, came into power; John of Giscala at their head tyrannized over the inhabitants.

While these events were taking place in Jerusalem, Vespasian had subdued the whole country, with the exception of one or two fortresses. But as he was setting about the siege of the capital, tidings arrived of the death of Nero, and the offensive was discontinued. For almost two years (June, 68, to April, 70), with a short break, war was suspended. When Vespasian at the end of this period became emperor, he intrusted to Titus the task of reducing Jerusalem. There in the interval the internal struggle had been going on, even after the radicals had gained the mastery. As a counterpoise to John of Giscala the citizens had received the guerrilla captain Simon bar Giora into the city; the two were now at feud with each other, but were alike in their rapacity toward the citizens. John occupied the temple, Simon the upper city lying over against it on the west. For a short time a third entered into competition with the two rivals, a certain Eleazar who had separated from John and established himself in the inner temple. But just as Titus was beginning the siege (Easter, 70) John contrived to get rid of this interloper.

Titus attacked from the north. After the lower city had fallen into his hands, he raised banks with a view to the storm of the temple and the upper city. But the defenders, who were now united in a common cause, taught him by their vigorous resistance that his object was not to be so quickly gained. He therefore determined to reduce them by famine, and for this end completely surrounded the city with a strong wall. In the beginning of July he renewed the attack, which he directed in the first instance against the temple. The tower of Antonia fell on the 5th, but the temple continued to be held notwithstanding; until the 17th the daily sacrifice continued to be offered. The Romans succeeded in gaining the outer court in August only. To drive them out, the Jews in the night of August 10–11 made a sortie, but were compelled to retire, the enemy forcing their way behind them into the inner court. A legionary flung a firebrand into an annex of the temple, and soon the whole structure was in flames. A terrible slaughter of the defenders ensued, but John with a determined band succeeded in cutting his way out, and by means of the bridge over the Tyropœon valley made his escape into the upper city.

No attack had as yet been directed against this quarter; but famine was working terrible ravages among the crowded population. Those in command, however, refused to capitulate unless freedom to withdraw along with their wives and children were granted. These terms being withheld, a storming, after the usual preparations on the part of the Romans, took place. The resistance was feeble; the strong towers were hardly defended at all; Simon bar Giora and John of Giscala now thought only of their personal safety. In the unprotected city the Roman soldiers spread fire and slaughter unchecked (September 7, 70).

Of those who survived also some were put to death; the rest were sold or carried off to the mines and amphitheaters. The city was leveled to the ground; the Tenth legion was left behind in charge. Titus took with him to Rome for his triumphal procession Simon bar Giora and John of Giscala, along with seven hundred other prisoners, also the sacred booty taken from the temple, the candlestick, the golden table, and a copy of the Torah. He was slightly premature with his triumph; for some time elapsed, and more than one bloody battle was necessary, before the rebellion was completely stifled. It did not come wholly to an end until the fall of Masada (April, 73).

Even now Palestine continued for awhile to be the center of Jewish life, but only in order to prepare the way for its transition into thoroughly cosmopolitan forms. The development of thought sustained no break on account of the sad events which had taken place, but was only directed once more in a consistent manner toward these objects which had been set before it from the time of the Babylonian exile. On the ruins of the city and of the temple the Pharisaic Judaism which rests upon the law and the school celebrated its triumph. National fanaticism, indeed, was not yet extinguished, but it burnt itself completely out in the vigorous insurrection led by Simeon bar Koziba (Bar Cochebas, 132–135). That a conspicuous rabbin, Akiba, should have taken part in it, and have recognized in Simeon the Messiah, was an inconsistency on his part which redounds to his honor.

Inasmuch as the power of the rabbins did not depend upon the political or hierarchical forms of the old commonwealth, it survived the fall of the latter. Out of what hitherto had been a purely moral influence something of an official position now grew. They formed themselves into a college which regarded itself as a continuation of the old synedrium, and which carried forward its name. At first its seat was Jamnia, but it soon removed to Galilee, and remained longest at Tiberias. The presidency was hereditary in the family of Hillel, with the last descendants of whom the court itself came to an end. The respect in which the synedrial president was held rapidly increased; like Christian patriarchs under Mahometan rule, he was also recognized by the imperial government as the municipal head of the Jews of Palestine, and bore the secular title of the old high priests. Under him the Palestinian Jews continued to form a kind of state within a state until the fifth century.

The task of the rabbins was so to reorganize Judaism under the new circumstances that it could continue to assert its distinctive character. What of external consistency had been lost through the extinction of the ancient commonwealth required to be compensated for by an inner centralization proportionally stronger. The separation from everything heathenish became more pronounced than before; the use of the Greek language was of necessity still permitted, but at least the Septuagint was set aside by Aquila (*Cod. Justinian*, Nov., 146) inasmuch as it had now become the Christian

Bible. For to this period also belongs the definitive separation between the synagogue and the church; henceforward Christianity could no longer figure as a Jewish sect. Intensified exclusiveness was accompanied by increased internal stringency. What at an earlier period had still remained to some extent fluid now became rigidly fixed; for example, an authentic text of the canon was now established, and at the same time the distinction between canon and apocrypha sharply drawn. The old tendency of the Scribes to leave as little as possible free to the individual conscience, but to bring everything within the scope of positive ordinance, now celebrated its greatest triumphs. It was only an apparent movement in the direction of liberty, if regulations which had become quite impossible were now modified or canceled. The most influential of the rabbins were indeed the least solicitous about the maintenance of what was old, and had no hesitation in introducing numerous and thorough-going innovations; but the conservatives, R. Eliezer ben Hyrcanus and R. Ishmael ben Elisha were in truth more liberal-minded than the leaders of the party of progress, notably than R. Akiba. Even the Ultramontanes have never hesitated at departures from the usage of the ancient and mediæval church; and the Pharisaic rabbins were guided in their innovations by liberal principles no more than they. The object of the new determinations was simply to widen the domain of the law in a consistent manner, to bring the individual entirely under the iron rule of system. But the Jewish communities gave willing obedience to the hierarchy of the rabbins; Judaism had to be maintained, cost what it might. That the means employed were well adapted to the purpose of maintaining the Jews as a firmly compacted religious community even after all bonds of nationality had fallen away cannot be doubted. But whether the attainment of this purpose by incredible exertion was a real blessing to themselves and the world may very well be disputed.

One consequence of the process of intellectual isolation and of the effort to shape everything in accordance with hard and fast rules and doctrines was the systematization and codification of juristic and ritual tradition, a work with which a beginning was made in the century following the destruction of Jerusalem. Toward the end of the second century the Pharisaic doctrine of Hillel as it had been further matured by Akiba was codified and elevated to the position of statute law by the patriarch Rabban Judah the Holy (Mishna). But this was only the first stage in the process of systematizing and fixing tradition. The Mishna became itself the object of rabbinical comment and supplement; the Tannaim, whose work was registered in the Mathnetha (Mishna, δευτέρωσις = doctrine), were followed by the Amoraim, whose work, in turn, took permanent shape in the Gemara (= doctrine). The Palestinian Gemara was reduced to writing in perhaps the fourth or fifth century; unfortunately, it has been preserved to us only in part, but appears to have reached the Middle Ages in a perfect state. Even thus the process which issued in the production of the Talmud was not yet completed; the Babylonian Amoraim carried it forward for some time longer, until at last, at the rise of Islam, the Babylonian Gemara was also written down.

In the fifth century Palestine ceased to be the center of Judaism. Several circumstances conspired to bring this about. The position of the Jews in the Roman empire had changed for the worse with the elevation of Christianity as the religion of the state; the large autonomy which until then they had enjoyed in Palestine was now restricted; above all, the family of the patriarchs, which had come to form a veritable dynasty, became extinct. But this did not make an end of what may be called the Jewish church-state; henceforward it had its home in Babylonia. From the period of the exile, a numerous and coherent body of Jews had continued to subsist there; the Parthians and Sassanidæ granted them self-government; at their head was a native prince (Resh Galutha can be clearly traced from second century A.D. onward) who, when the Palestinian patriarchate came to an end, was left without a rival. This remarkable relic of a Jewish commonwealth continued to exist until the time of the Abassides. Even as early as the beginning of the third century A.D. certain rabbins, at their head Abba Areka (Rab), had migrated from Palestine and founded a settlement for learning the law in Babylonia. The schools there (at Pumbeditha, Sora, Nahardea) prospered greatly, vied with those of Palestine, and continued to exist after the cessation of the latter, when the patriarchate became extinct. Thus they had the last word in the settlement of doctrine.

Something still remains to be said with reference to the diaspora. We have seen how it began; in spite of Josephus it is to be carried back not to the Assyrian but merely to the Babylonian captivity; it was not composed of Israelites, but solely of citizens of the southern kingdom. It received its greatest impulse from Alexander, and then afterward from Cæsar. In the Græco-Roman period Jerusalem at the time of the great festival presented the appearance of a veritable Babel; with the Jews themselves were mingled the proselytes, for even already that religion was gaining considerable conquests among the heathens. In the west of Europe also they were not wanting; many thousands of them lived in Rome. In those cities where they were at all numerous they during the imperial period formed separate communities; Josephus has preserved a great variety of documents in which the Roman authorities recognize their rights and liberties (especially as regards the Sabbath rest and the observance of festivals). Of greatest importance was the community in Alexandria; according to Philo 1,000,000 of Jews had their residence there, under an ethnarch for whom a gerusia was afterward substituted by Augustus. The extent to which this diaspora was helpful in the diffusion of Christianity, the manner in which the mission of the apostles everywhere attached itself to the synagogues and proseuchai, is well known from the New Testament. That the Christians of the first century had much to suffer along with the Jews is also a familiar fact. For at this period, in other respects more favorable to them than any other had previously been, the Jews had occasionally to endure persecution. The emperors, taking umbrage at their intrusiveness, more than once banished them from Rome (Acts xviii. 2). The good will of the native population they never secured; they were most hated in Egypt and Syria, where they were strongest.

The position of the Jews in the Roman empire was naturally not improved by the great risings under Nero, Trajan (in Cyrene, Cyprus, Mesopotamia), and Hadrian. The East, strictly so called, became more and more their proper home. The Christianization of the empire helped still further in a very special way to detach them from the Western world. They sided with the Persians against the Byzantines; in the year 614 they were even put in possession of Jerusalem by Chosroes, but were not long able to hold their own against Heraclius. With Islam also they found themselves in greater sympathy than with Christianity, although they were cruelly treated by Mahomet in Arabia, and driven by Omar out of the Hejaz, and notwithstanding the facts that they were as matter of course excluded from citizenship, and that they were held by Moslems as a whole in greater contempt than the Christians. They throve especially well on what may be called the bridge between East and West, in Mauretania and Spain, where they were the intellectual intermediaries between the Arab and the Latin culture. In the Sephardim and Ashkenazim the distinction between the subtler Oriental and the more conservative Western Jews has maintained itself in Europe also. From the eighth century onward, Judaism put forth a remarkable side shoot in the Khazars on the Volga; if legend is to be believed, but little was required at one time to have induced the Russians to accept the Jewish rather than the Christian faith.

In the West the equal civil rights which Caracalla had conferred on all free inhabitants of the empire came to an end so far as the Jews were concerned, in the time of Constantine. The state then became the secular arm of the church, and took action though with less severity, against Jews just as against heretics and pagans. As early as the year 315, Constantine made conversion from Christianity to Judaism a penal offense, and prohibited Jews, on pain of death, from circumcising their Christian slaves. These laws were reënacted and made more severe by Constantius, who attached the penalty of death to marriages between Jews and Christians. Theodosius I. and Honorius, indeed, by strictly prohibiting the destruction of synagogues, and by maintaining the old regulation that a Jew was not to be summoned before a court of justice on the Sabbath day, put a check upon the militant zeal of the church by which even Chrysostom, for example, allowed himself to be carried away at Antioch. But Honorius rendered them ineligible for civil or military service, leaving open to them only the bar and the decurionate, the latter being a *privilegium odiosum*. Their liberty to try cases by their own law was curtailed; cases between Jews and Christians were to be tried by Christian judges only. Theodosius II. prohibited them from building new synagogues, and anew enforced their disability for all state employments. Most hostile of all was the orthodox Justinian, who, however, was still more severe against Pagans and Samaritans. He harassed the Jews with a law enjoining them to observe Easter on the same day as the Christians, a law which it was of course found impossible to carry out.

In the Germanic states which arose upon the ruins of the Roman empire, the Jews did not fare badly on the whole. It was only in cases where the state was dominated by the Catholic Church, as, for example, among the Spanish Visigoths, that they were cruelly oppressed; among the Arian Ostrogoths, on the other hand, they had nothing to complain of. One thing in their favor was the Germanic principle that the law to be applied depended not on the land but on the nationality, as now in the east Europeans are judged by the consuls according to the law of their respective nations. The autonomy of the Jewish communities, which had been curtailed by the later emperors, was now enlarged once more under the laxer political and legal conditions. The Jews fared remarkably well under the Frankish monarchy; the Carolingians helped them in every possible way, making no account of the complaints of the bishops. They were allowed to hold property in land, but showed no eagerness for it; leaving agriculture to the Germans, they devoted themselves to trade. The market was completely in their hands; as a specially lucrative branch of commerce they still carried on the traffic in slaves which had engaged them even in ancient times.

Meanwhile the church was not remiss in seeking constantly repeated reënactments of the old imperial laws, in the framing of which she had had paramount influence, and which she now incorporated with her own canon law. Gradually she succeeded in attaining her object. In the later Middle Ages the position of the Jews in the Christian society deteriorated. Intercourse with them was shunned; their isolation from being voluntary became compulsory; from the thirteenth century onward they were obliged to wear, as a distinctive mark (more necessary in the East than in the West), a round or square yellow badge on their breast. The difference of religion elicited a well-marked religious hate with oft-repeated deadly outbreaks, especially during the periods of the crusades, and afterward when the Black Death was raging (1348–50). Practical consequences like these the church of course did not countenance; the popes set themselves against persecutions of the Jews, but with imperfect success. The popular aversion rested by no means exclusively on religious considerations; worldly motives were also present. The Jews of that period had in a still higher degree than now the control of financial affairs in their hands; and they used it without scruple. The church herself had unintentionally given them a monopoly of the money market, by forbidding Christians to take interest. In this way the Jews became rich indeed, but at the same time made themselves still more repugnant to the Christian population than they previously were by reason of their religion.

Having, according to the later mediæval system, no rights in the Christian state, the Jews were tolerated only in those territories where the sovereign in the exercise of free favor accorded them protection. The protection was granted them in many quarters, but never for nothing; numerous and various taxes, which could be raised or changed in a perfectly arbitrary way, were exacted in exchange. But in countries where the feeling of nationality attained to a vigorous development, the spirit of toleration was speedily exhausted; the Jews were expelled by the act of the state. England was the first kingdom in which this occurred (1290); France followed in 1395, Spain and Portugal in 1492 and 1495. In this way it came about that the Holy Roman Empire—Germany, Italy, and adjoining districts—became the chief abode of the Jews. In the anarchy which here prevailed they could best maintain their separate attitude, and if they were expelled from one locality they readily found refuge in some other. The emperor had indeed the right of extirpating them altogether (with the exception of a small number to be left as a memorial); but, in the first place, he had in various ways given up this right to the states of the empire, and, moreover, his pecuniary resources were so small that he could not afford to give up the tax which the Jews as his "servi cameræ" paid him for protecting their persons and property. In spite of many savage persecutions the Jews maintained their ground, especially in those parts of Germany where the political confusion was greatest. They even succeeded in maintaining a kind of autonomy by means of an arrangement in virtue of which civil processes which they had against each other were decided by their own rabbins in accordance with the law of the Talmud.

The Jews, through their having on the one hand separated themselves, and on the other hand been excluded on religious grounds from the Gentiles, gained an internal solidarity and solidity which has hitherto enabled them to survive all the attacks of time. The hostility of the Middle Ages involved them in no danger; the greatest peril has been brought upon them by modern times, along with permission and increasing inducements to abandon their separate position. It is worth while to recall on this point the opinion of Spinoza, who was well able to form a competent judgment: "That the Jews have maintained themselves so long in spite of their dispersed and disorganized condition is not at all to be wondered at, when it is considered how they separated themselves from all other nationalities in such a way as to bring upon themselves the hatred of all, and that not only by external rites contrary to those of other nations, but also by the sign of circumcision which they maintain most religiously. Experience shows that their conservation is due in a great degree to the very hatred which they have incurred. When the king of Spain compelled the Jews either to accept the national religion or to go into banishment, very many of them accepted the Roman Catholic faith, and in virtue of this received all the privileges of Spanish subjects, and were declared eligible for every honor; the consequence was that a process of absorption began immediately, and in a short time neither trace nor memory of them survived. Quite different was the history of those whom the king of Portugal compelled to accept the creed of his nation; although converted, they continued to live apart from the rest of their fellow subjects, having been declared unfit for any dignity. So great importance do I attach to the sign of circumcision also in this connection that I am persuaded that it is sufficient by itself to maintain the separate existence of the nation forever." The persistency of the race may of course prove a harder thing to overcome than Spinoza has supposed; but nevertheless he will be found to have spoken truly in declaring that the so-called emancipation of the Jews must inevitably lead to the extinction of Judaism wherever the process is extended beyond the political to the social sphere. For the accomplishment of this centuries may be required. (See JEWS.)

ISSACHAR, "there is a hire, or reward;" Jacob's ninth son, his fifth by Leah. The territory of the tribe included the whole of the great plain of Esdraelon, and the hills to the east of it, the boundary in that direction extending from Tabor to the Jordan, apparently along the deep gorge of Wady Bîreh. Of the sixteen cities enumerated, the greater number has been successfully identified.

ISSIK-KUL, a large lake of Central Asia, lying in a deep basin between the Trans-Ili Ala-tau and the Tian Shan mountains. The greatest length from west-southwest to east-northeast is 120 or 125 miles, and the greatest breadth 33 miles, the area being estimated at not less than 2,260 square miles.

ISSOIRE, chief town of an arrondissement in the department of Puy-de-Dôme, France, situated on the Couze, near its junction with the Allier, twenty miles southeast of Clermont. Population about 7,200.

ISSOUDUN, chief town of an arrondissement in the department of Indre, France, is situated on the Théols, seventeen miles northeast of Châteauroux, and 145 miles south of Paris. Population about 12,000.

ISTALIF. See AFGHANISTAN.

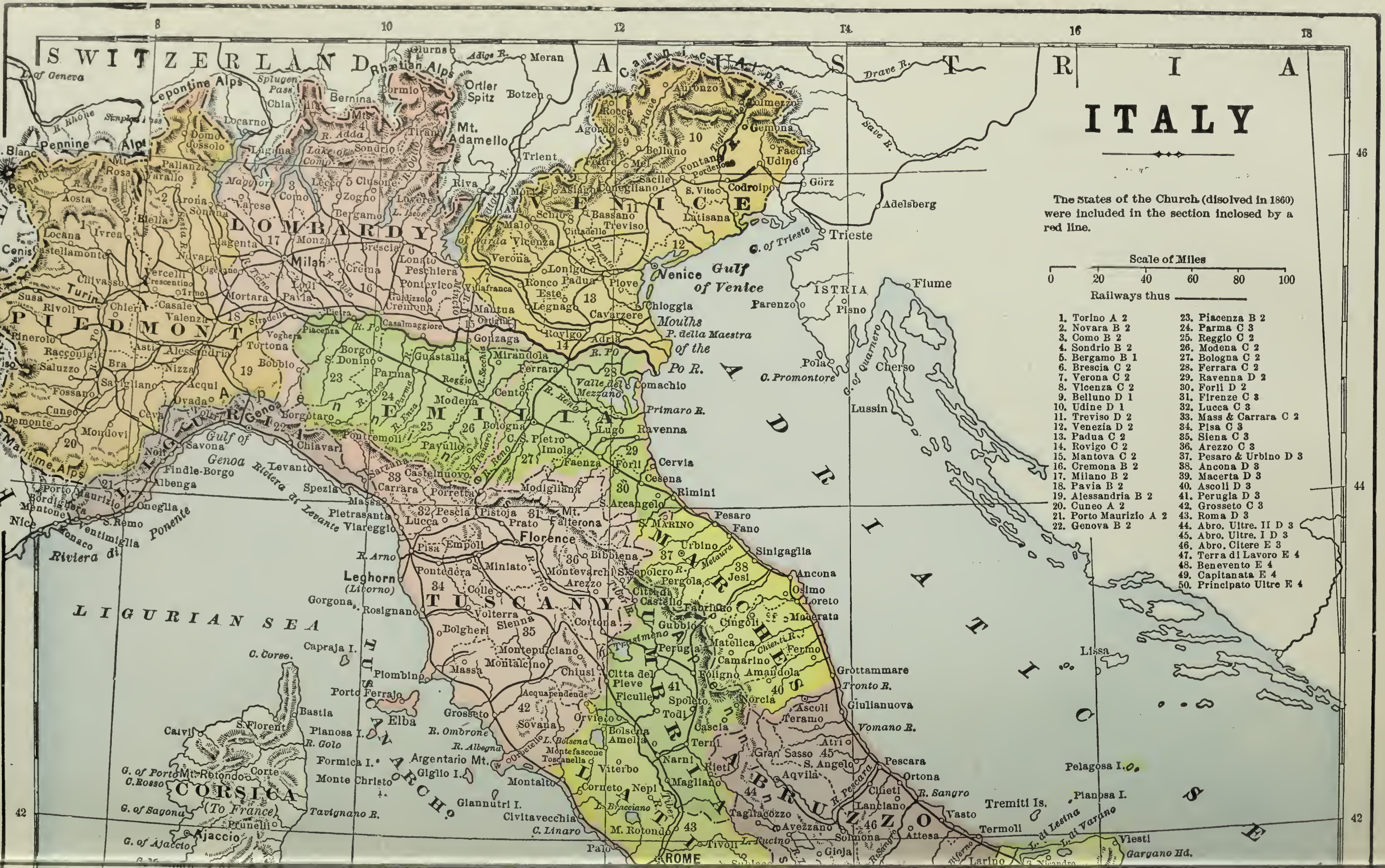
ISTHMIAN GAMES, one of the four great Panhellenic festivals, were held on the Isthmus of Corinth. An ancient ceremony of the worship of Melicertes or Melkarth, introduced by the Phœnician traders who frequented the isthmus from the earliest time, was afterward modified by the Old Ionic worship of Poseidon; and at the festival the heroes Neleus and Sisyphus received honor along with the two deities. About 582 B.C. the festival was arranged after the analogy of the Olympian and Pythian games, but was celebrated every two years. The festival was managed by the Corinthians; and after the city was destroyed by Mummius (146 B.C.) the presidency passed to the Sicyonians until Julius Cæsar restored Corinth. The Athenians were closely connected with the festival, and had the privilege of *proedria*, the foremost seat at the games, while the Eleans were absolutely excluded from participation. The games included gymnastic, equestrian, and musical contests; and the prize was a crown made at one time of parsley, at a later period of pine.

ISTIB or ISHTIB, a town of European Turkey, in the eyalet of Nish (Macedonia), a few miles southeast of Uskub, situated at a height of 590 feet on a small stream of its own name, which joins the Bregalnitza, a tributary of the Vardar. It is estimated to contain from 15,000 to 20,000 houses, and possesses several fine mosques, a number of fountains, and a large bazaar. A small syenitic knoll to the northwest is crowned by the ruins of an old castle. Istib is the ancient Astibus.

ISTRIA (anciently also *Histria*, in German *Istrien*, and formerly *Histerreich*), a margraviate of Austria, forming the southern part of Küstenland crownland, is contained in the peninsula which, bounded on the north by the districts of Trieste, Görz, and Carniola, stretches southward into the Adriatic Sea, between the Gulf of Trieste and the Gulf of Quarnaro. The area of the official district, which includes Veglia, Cherso, Lussino, and other smaller islands on the southeast coast, is 1,908 square miles, of which 1,545 belong to the peninsula itself. The surface is mountainous, especially in the north and east regions, which are occupied by offshoots from the Julian Alps. About one-half of the total area is occupied with scanty grass and pasture land, while timber and the various annual crops divide the remainder in different proportions. Wheat, oats, potatoes, and rye are grown in the north, and in the south wheat, maize, rye, olives, vines, and melons. Many of the inhabitants are engaged in a seafaring life, in fishing, and in preparing salt for fish-curing. Shipbuilding, sheep and cattle rearing, and the manufacture of oil, wine, and bricks are also noteworthy industries. The best sorts of wine are made near Capo d'Istria, Muggia, Isola, Parenzo, and Dignano; and the oil of Istria was famous even in Roman times. The trade of the peninsula is unimportant.

ITALY, or more correctly ITALIA, is the name that has been applied both in ancient and modern times to the great peninsula that projects from the mass of central Europe far to the south into the Mediterranean Sea, where the great island of Sicily may be considered as in fact a mere continuation or appendage of the continental promontory. Confining ourselves, however, to Italy itself, its natural boundaries are marked with a distinctness that is quite exceptional. The portion of the Mediterranean commonly termed by geographers the Tyrrhenian Sea forms its limit on the west and south, and the Adriatic on the east; while to the north, where it joins the main continent of Europe, it is separated from the adjacent regions by the mighty chain of the Alps, which sweeps round in a vast semicircle from the head of the Adriatic to the shores of Nice and Monaco, presenting throughout an almost unbroken mountain barrier.

Italy's greatest length is from northwest to southeast, in which direction it measures 718 English miles in a direct line from the boundary near Courmayeur to the Cape Sta Maria di Leuca, south of Otranto, but the great mountain peninsula of Calabria extends about two degrees farther south to Cape Spartivento. Its breadth is, owing to its configuration, very irregular. The northern portion, measured from the Alps at the Monte Viso to the mouth of the Po, has a breadth of 270 English miles, and from the Monte Viso to the head of the Adriatic near the mouth of the Isonzo it measures 340 English miles. But the peninsula of Italy, which forms the largest portion of the country, nowhere exceeds 130 geographical miles in breadth, while it does not generally measure more than from 90 to 100 miles across. Its southern extremity, now called Calabria, forms a complete peninsula, being united to the mass



ITALY

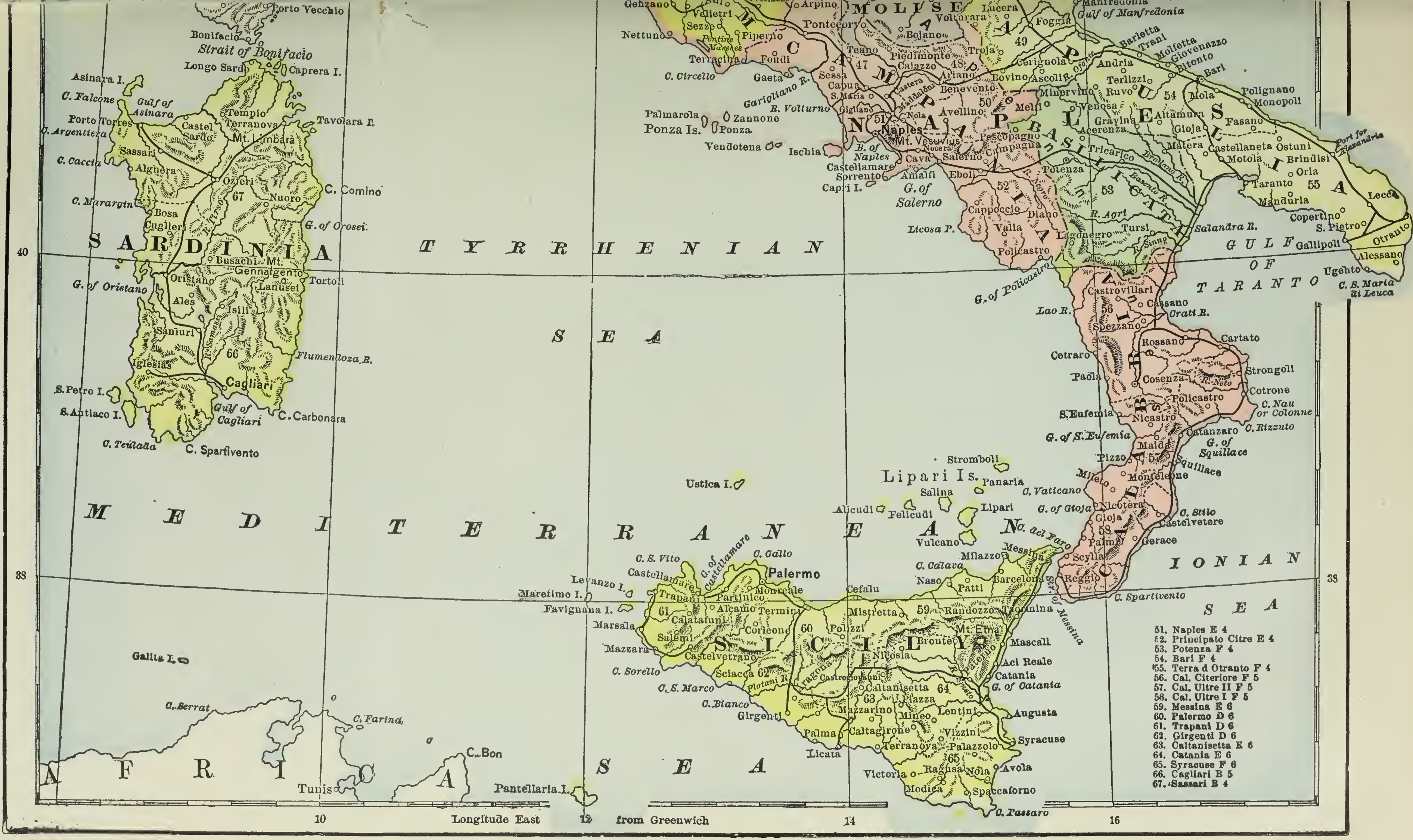
The States of the Church (disolved in 1860) were included in the section inclosed by a red line.

Scale of Miles

0 20 40 60 80 100

Railways thus

1.	Torino	A 2
2.	Novara	B 2
3.	Como	B 2
4.	Sondrio	B 2
5.	Bergamo	B 1
6.	Brescia	C 2
7.	Verona	C 2
8.	Vicenza	C 2
9.	Belluno	D 1
10.	Udine	D 1
11.	Treviso	D 2
12.	Venezia	D 2
13.	Padua	C 2
14.	Rovigo	C 2
15.	Mantova	C 2
16.	Cremona	B 2
17.	Milano	B 2
18.	Pavia	B 2
19.	Alessandria	B 2
20.	Cuneo	A 2
21.	Porto Maurizio	A 2
22.	Genova	B 2
23.	Piacenza	B 2
24.	Parma	C 3
25.	Reggio	C 2
26.	Modena	C 2
27.	Bologna	C 2
28.	Ferrara	C 2
29.	Ravenna	D 2
30.	Forli	D 2
31.	Firenze	C 3
32.	Lucca	C 3
33.	Mass & Carrara	C 2
34.	Pisa	C 3
35.	Siena	C 3
36.	Arezzo	C 3
37.	Pesaro & Urbino	D 3
38.	Ancona	D 3
39.	Macerta	D 3
40.	Ascoli	D 3
41.	Perugia	D 3
42.	Grosseto	C 3
43.	Roma	D 3
44.	Abro. Ultre. II	D 3
45.	Abro. Ultre. I	D 3
46.	Abro. Citere	E 3
47.	Terra di Lavoro	E 4
48.	Benevento	E 4
49.	Capitanata	E 4
50.	Principato Ultre	E 4


SARDINIA
SICILY
TYRRHENIAN SEA
MEDITERRANEAN SEA
IONIAN SEA
AFRICA
MOLISE
CAMPANIA
NAPLES
APULIA
PUGLIE
BASILICATA
CALABRIA
GULF OF TARANTO
Gulf of Manfredonia
Strait of Bonifacio
Gulf of Asinara
G. of Orosei
G. of Oristano
Gulf of Cagliari
G. of Salerno
B. of Naples
G. of Policastro
G. of S. Eufemia
G. of Squillace
G. of Gioja
G. of Castellamare
G. of Catania
Str. of Messina
Lipari Is.
Ponza Is.
Porto Vecchio
Bonifacio
Longo Sardo
Caprera I.
Asinara I.
C. Falcone
Porto Torres
C. Argentiera
Tavolara I.
Tempio
Terranova
Castel Sardo
Mt. Limbara
Sassari
C. Caccia
Alghera
Ozieri
67
Nuoro
C. Comino
C. Marargin
Bosa
Cugileri
R. Tirso
Busachi
Mt. Gennargento
Tortoli
Oristano
Lanusei
Ales
Isili
Sanluri
R. Samassi
66
Flumendoza R.
Iglesias
Cagliari
S. Pietro I.
S. Antiaco I.
C. Carbonara
C. Teulada
C. Sparfivento
Genzano
Nettuno
Velletri
Sezze
Pontine Marshes
Piperno
Terracina
Fondi
C. Circello
Gaeta
Arpino
Pontecorvo
Teano
47
Sessa
Capua
S. Maria
Garigliano R.
R. Volturno
Giugliano
Palmarola
Zannone
Ponza
Vendotena
Ischia
51
Naples
Mt. Vesuvius
Castellamare
Sorrento
Capri I.
Cava
Nocera
Amalfi
Salerno
Eboli
Bojano
Piedimonte
Calazzo
Caserta
Maddaloni
Nola
Avellino
Ariano
48
Benevento
Troja
Volturara
Lucera
Foggia
49
Cerignola
Bovino
Ascoli
Ofanto R.
50
Melfi
Pescopagno
Campagna
Potenza
52
Cappoccio
Diano
Valla
Policastro
R. Negro
Licosa P.
Lagonegro
53
Tricarico
Acerenza
Minervino
Venosa
Gravina
Andria
Barletta
Trani
Molfetta
Giovenazzo
Bitonto
Bari
Terlizzi
Ruvo
54
Altamura
Mola
Polignano
Monopoli
Gioja
Fasano
Matera
Castellaneta
Ostuni
Motola
Brindisi
Port for Alexandria
Oria
Taranto
55
Manduria
Lecce
Copertino
S. Pietro
Otranto
Gallipoli
Alessano
Ugento
C. S. Maria di Leuca
Bradano R.
Basento R.
R. Agri
Tursi
R. Sinno
Salandra R.
Castrovillari
56
Cassano
Crati R.
Lao R.
Spezzano
Cetraro
Rossano
Cartato
Paola
Cosenza
R. Neto
Strongoli
Cotrone
C. Nau or Colonne
Policastro
S. Eufemia
Nicastro
Catanzaro
C. Rizzuto
Maida
57
Pizzo
Squillace
Mileto
Monteleone
C. Vaticano
Nicotera
C. Stilo
Castelvetere
Gioja
58
Palmi
Gerace
Scylla
Reggio
C. Spartivento
Stromboli
Panaria
Salina
Lipari
Alicudi
Felicudi
Vulcano
Ustica I.
C. del Faro
Messina
Milazzo
C. Calava
Naso
Patti
Barcelona
Taormina
59
Randozzo
Mt. Etna
Bronte
Mascali
Aci Reale
Catania
R. Simeto
Cefalu
Mistretta
Pollizzi
60
Nicosia
C. Gallo
Palermo
Monreale
Termini
Partinico
Alcamo
Corleone
C. S. Vito
Castellamare
Trapani
61
Calatafimi
Salemi
Castelvetrano
Levanzo I.
Maretimo I.
Favignana I.
Marsala
Mazzara
C. Sorello
Sciacca
62
Platani R.
C. S. Marco
C. Bianco
Girgenti
Fiume Salso
Castrogiovanni
Caltanisetta
63
Piazza
64
Mazzarino
Mineo
Lentini
Augusta
Palma
Caltagirone
Vizzini
Syracuse
Licata
Terranova
Palazzolo
65
Victoria
Ragusa
Nola
Avola
Modica
Spaccaforno
C. Passaro
Galita I.
C. Serrat
C. Farina
Tunis
C. Bon
Pantellaria I.
40
38
10
Longitude East
12
from Greenwich
14
16
51. Naples E 4
52. Principato Citre E 4
53. Potenza F 4
54. Bari F 4
55. Terra d Otranto F 4
56. Cal. Citeriore F 5
57. Cal. Ultre II F 5
58. Cal. Ultre I F 5
59. Messina E 6
60. Palermo D 6
61. Trapani D 6
62. Girgenti D 6
63. Caltanisetta E 6
64. Catania E 6
65. Syracuse F 6
66. Cagliari B 5
67. Sassari B 4

of Lucania or the Basilicata by an isthmus of only thirty-five English miles in width, while that between the Gulfs of Sta Eufemia and Squillace, which connects the two portions of the province, does not exceed twenty miles. The area of the present kingdom of Italy, exclusive of the large islands, is computed at 93,640 square miles. Savoy, which until the treaty of 1860 was commonly considered as included in Italy, on account of its being comprised in the kingdom of Sardinia, as a matter of physical geography unquestionably belongs to France (to which it is now politically united), being separated from the Italian province of Piedmont by the main chain of the Alps.

While the Alps constitute the northern boundary of Italy, its configuration and internal geography are determined almost entirely by the great chain of the Apennines, which branches off from the Maritime Alps between Nice and Genoa, and, after stretching in the first instance in an unbroken line across from the Gulf of Genoa to the Adriatic, then turns more to the south, and is continued throughout the whole of Central Southern Italy, of which it forms as it were the backbone, until it ends in the southernmost extremity of Calabria at Cape Spartivento. The great spur or promontory projecting toward the east to Brindisi and Otranto, which figures in the older maps of Italy as if it were constituted by a branch from the main range of the Apennines, is not in reality so formed, and has no direct connection with the central chain.

One chief result of the manner in which the Apennines thus traverse the whole of Italy from the Mediterranean to the Adriatic is the marked division between Northern Italy, including the region north of the Apennines and extending thence to the foot of the Alps, and the central and more southerly portions of the peninsula. No such line of separation exists farther south, and the terms Central and Southern Italy, though in general use among geographers, and convenient for descriptive purposes, do not correspond to any natural divisions of the great Italian peninsula.

Northern Italy.—By far the larger portion of Northern Italy is occupied by the basin of the Po, which comprises the whole of the broad plain extending from the foot of the Apennines to that of the Alps, together with the valleys and slopes on both sides of it. Throughout its whole course indeed, from its source in Monte Viso to its outflow into the Adriatic—a distance of more than five degrees of longitude, or 220 miles in a direct line—the Po receives all the waters that flow from the Apennines northward, and all those that descend from the Alps toward the south, till one comes to the Adige, which, after pursuing a parallel course with the Po for a considerable distance, enters the Adriatic by a separate mouth.

There is no other instance in Europe of a basin of similar extent equally clearly characterized—the perfectly level character of the plain being as striking as the boldness with which the lower slopes of the mountain ranges begin to rise on each side of it. This is most clearly marked on the side of the Apennines, where the great Emilian Way, which has been the high road from the time of the Romans to our own, preserves an unbroken straight line from Rimini to Piacenza, a distance of more than 150 miles, during which the underfalls of the mountains continually approach it on the left, without once crossing the line of road. On the side of the Alps the boundary is more varied and broken, the great projecting masses of those mountains being intersected by large rivers, which produce valleys of considerable extent running far up into the mountains. But still, from whatever point the traveler approaches the Alps, he will be struck by the manner in which the unbroken alluvial plain extends quite up to the foot of the actual mountains or their immediate offshoots—presenting in this respect a striking contrast with the broken, hilly country which is found on the north side of the Alps both in Switzerland and in Austria.

The only exception to this uniform level occurs in the Montferrat region, which consists principally of hills of moderate elevation and of Tertiary formation, projecting to the north from the Ligurian Apennines, and occupying a breadth of about fifty miles from the neighborhood of Turin to that of Alessandria, around which the Po is compelled to form a great bend between Turin and Valenza, leaving, however, a broad strip of plain (from fifteen to thirty miles across) between its north bank and the foot of the Alps. The detached group of the Euganean hills, within sight of the Adriatic, though separated from the nearest Alps by a very narrow strip of plain, is wholly independent of that great chain, and forms a separate and isolated mass of volcanic origin.

Besides the delta of the Po and the large marshy tracts which it forms, there exist on both sides of it extensive lagoons of salt water, generally separated from the Adriatic by narrow strips of sand or embankments, partly natural, partly artificial, but having openings from distance to distance through these barriers, which admit of the influx and efflux of the sea-water, and serve as ports for communication with the mainland. The best known and the most extensive of these lagoons is that in which Venice is situated, and which extends from Torcello in the north to Chioggia and Brondolo in the south, a distance of above forty miles; but they were formerly much more extensive, and afforded a continuous means of internal navigation, by what were called "the Seven Seas," from Ravenna to Altinum, a few miles north of Torcello. That city, like Ravenna, originally stood in the midst of a lagoon; and the coast to the east of it, the whole way to near Monfalcone, where it meets the mountains, is occupied by similar expanses of water, which are, however, continually drying up and becoming gradually converted into dry land. The changes in the coast line have consequently been considerable throughout this extent.

The tract in the interior, adjoining this long line of lagoons, is, like the basin of the Po, a broad expanse of perfectly level alluvial plain, extending from the Adige eastward to the Carnic Alps, where they approach close to the Adriatic between Aquileia and Trieste, and northward to the foot of the great chain, which here sweeps round in a semicircle from the neighborhood of Vicenza to that of Aquileia. The space thus included was known in ancient times as Venetia, a name applied in the Middle Ages to the well-known city; the eastern portion of it became known in the Middle Ages as the Frioul or Friuli.

The narrow strip of coast-land between the Maritime Alps, the Apennines and the sea—called in ancient times Liguria, and now known as the Riviera of Genoa—though belonging in respect of latitude to Northern Italy, is in other respects quite distinct from the region included under that name. Throughout its whole extent, from Nice to Genoa on the one side, and again from Genoa to Spezia on the other, it is almost wholly mountainous, being occupied by the branches and offshoots of the mountain ranges at the back, which separate it throughout from the great plain to the north, while they send down their lateral ridges close to the water's edge, leaving only in places a few square miles of level plains at the mouths of the rivers and openings of the valleys.

From the proximity of the mountains to the sea none of the rivers in this part of Italy have any long course, and they are generally mere mountain torrents, rapid and swollen in winter and spring, and almost dry in summer. The largest and most important are those which descend from the Maritime Alps between Nice and Albenga. The same remark applies to the Riviera east of Genoa.

The Apennines, as has been already mentioned, here traverse the whole breadth of Italy, cutting off the peninsula properly so termed from the broader mass of Northern Italy by a continuous barrier of considerable breadth, though of far inferior elevation to that of the Alps. The Ligurian Apennines, which may be considered as taking their rise in the neighborhood of Savona, where a pass of very moderate elevation connects them with the Maritime Alps, of which they are in fact only a continuation, are among the least lofty portions of that long range. Throughout this tract the Apennines are generally covered with extensive forests of chestnut, oak and beech; while their upper slopes afford admirable pasturage. But few towns of any importance are found either on their northern or southern declivity, and the former region especially, though occupying a broad tract of from thirty to forty miles in width, between the crest of the Apennines and the plain of the Po, is one of the least known and at the same time least interesting portions of Italy.

Central Italy.—It has already been observed that this term is merely one used by geographers as a matter of convenience, and does not correspond to any natural division of the peninsula. Nor does it correspond with any received political division, for though the kingdom of Naples, which so long constituted a separate government, might be considered as representing Southern Italy, its three northern provinces, known as the Abruzzi, certainly belong rather to the central portion of the peninsula, with which they correspond in physical characters as well as in latitude and position. Writers on ancient geography generally include Campania and Samnium also in Central Italy, a division rendered convenient by the close relations existing between those countries and Latium, the political center of Italy in those days. But as a mere geographical division it seems more convenient to include all the provinces that formed part of the kingdom of Naples, with the exception of the three Abruzzi, in Southern Italy.

The geography of Central Italy is almost wholly determined by the great range of the Apennines, which traverse its whole extent in a direction from about north-northeast to south-southwest, almost precisely parallel to that of the coast of the Adriatic from Rimini to Pescara. The line of the highest summits and of the watershed ranges at a distance of about thirty to forty miles from the Adriatic, while it is separated by about double that distance from the Tyrrhenian Sea on the west. It is in this part of the range that almost all the highest points of the Apennines are found.

The two valleys of the Arno and the Tiber (called in Italian *Tevere*) may be considered as furnishing the key to the geography of all of Italy west of the Apennines. The Arno, which has its source in the Monte Falterona, one of the most elevated summits of the main chain of the Tuscan Apennines, flows at first nearly south till in the neighborhood of Arezzo it turns abruptly to the northwest, and pursues that course as far as Pontassieve, where it again makes a sudden bend to the west, and pursues a westerly course from there to the sea, passing through the two celebrated cities of Florence and Pisa. Its principal tributary is the Sieve, which joins it at Pontassieve, bringing down the waters of the Val di Mugello. The Elza and the Era, which join it on its right bank, descending from the hills near Siena and Volterra, are inconsiderable streams; and the Serchio, which flows from the territory of Lucca and the Alpi Apuani, and formerly joined the Arno a few miles from its mouth, now enters the sea by a separate channel. The most considerable rivers of Tuscany south of the Arno are the Cecina, which flows through the plain below Volterra, and the Ombrone, which rises in the hills near Siena, and enters the sea about twelve miles below Grosseto.

The Tiber, a much more important river than the Arno, and the largest in Italy with the exception of the Po, rises in the Apennines, about twenty miles east of the source of the Arno, and flows nearly south by Borgo S. Sepolcro and Citta di Castello, then between Perugia and Todi to Orte, just below which it receives the waters of the Nera. Its tributaries in the upper part of its course are of little importance, but the Nera, which rises in the lofty group of the Monte della Sibilla, is a very considerable stream, and brings with it the waters of the Velino (with its tributaries the Turano and the Salto), which joins it a few miles below its celebrated waterfall at Terni. The Teverone or Anio, which enters the Tiber a few miles above Rome, is a very inferior stream to the Nera, but brings down a considerable body of water from the mountains above Subiaco. It is a singular fact in the geography of Central Italy that the valley of the Tiber and that of the Arno are in some measure connected by that of the Chiana, a level and marshy tract, the waters from which flow partly into the Arno and partly into the Tiber.

The eastern declivity of the central Apennines toward the Adriatic is far less interesting and varied than the western. The central range here approaches (as has been already pointed out) much nearer to the sea, and hence, with few exceptions, the rivers that flow from it have but short courses and are of comparatively little importance.

The whole of this portion of Central Italy, between the Apennines and the sea, is a hilly country, much broken and cut up by the torrents from the mountains, but fertile, especially in fruit-trees, olives and vines; and hence it has been, both in ancient and modern times, a populous district, containing many small towns though no great cities. Its chief disadvantage is the absence of ports, the coast preserving an almost unbroken straight line, with the single exception of Ancona, which has in all ages been the only port worthy of the name on the eastern coast of Central Italy.

Southern Italy.—The great central mass of the Apennines, which has held its course throughout Central Italy, with a general direction from northwest to southeast, may be considered as continued in the same direction for about one hundred miles farther, from the basin-shaped group of the Monti del Matese (which rises to the height of 6,660 feet) to the neighborhood of Potenza, in the heart of the province of Basilicata, corresponding nearly to the ancient Lucania. The whole of the district known in ancient times as Samnium (a part of which still retains the name of Sannio, though now officially designated as the province of Molise) is occupied by an irregular mass of mountains, of much inferior height to those of Central Italy, and having still less of the character of a regular range, being broken up into a number of groups or masses, intersected by rivers, which have for the most part a very tortuous course. This mountainous tract, which has an average breadth of from fifty to sixty miles, is bounded on the west by the plains of Campania, now called the Terra di Lavoro, and on the east by the much broader and more extensive tract of Apulia or Puglia, composed partly of level plains, but for the most part of undulating downs of slight elevation, and contrasting strongly with the mountain ranges of the Apennines, which rise abruptly above them

The rivers of Southern Italy are none of them of any great importance. The Liris or Garigliano, which has its source in the central Apennines above Sora, not far from the Lake Fucino, and enters the Gulf of Gaeta about ten miles east of the city of that name, brings down a considerable body of water; as does also the Volturno, which rises in the mountains between Castel di Sangro and Agnone, flows past Isernia, Venafro, and Capua, and enters the sea about fifteen miles from the mouth of the Garigliano. About sixteen miles above Capua it receives the Calore, which flows by Benevento, and is a tributary of some importance. The Silarus or Sele, which enters the Gulf of Salerno a few miles below the ruins of Pæstum, is the only other river of consideration on the western coast of Southern Italy. Below this the watershed of the Apennines is too near to the sea on that side to allow of the formation of any streams of importance. Hence the rivers that flow in the opposite direction into the Adriatic and the Gulf of Taranto have much longer courses, and are of more considerable volume and magnitude, though all of them partaking of the character of mountain torrents, rushing down with great violence in winter and after storms, but dwindling into scanty streams in the summer, which hold a winding and sluggish course through the great plains of Apulia.

Lakes.—The only important lakes in Italy are those at the foot of the Alps, formed by the expansion of the tributaries of the Po, which, after descending from the mountain valleys in which they are at first confined, spread out into considerable sheets of water before traversing the extensive plain of Northern Italy. They have been already noticed in connection with the rivers by which they are formed, but may be again enumerated in order of succession. They are, proceeding from west to east, the Lago d'Orta, the Lago Maggiore, the Lago di Lugano, the Lago di Como, the Lago d' Iseo, the Lago d' Idro, and the Lago di Garda. Of these the last named is considerably the largest, covering a superficial area of about 140 English square miles. It is about thirty-eight miles long by twelve broad at its southern extremity; while the Lago Maggiore, notwithstanding its name, though considerably exceeding it in length (forty-two miles), falls materially below it in superficial extent. They are all of great depth—the Lago Maggiore having in one part a depth of 2,600 feet, while that of Como attains to 1,925 feet. Of a wholly different character is the Lago di Varese, between the Lago Maggiore and that of Lugano, which is a mere shallow expanse of water, surrounded by hills of very moderate elevation. Two other small lakes in the same neighborhood, as well as those of Erba and Pusiano, between Como and Lecco, are of a similar character, and scarcely worthy of notice.

The lakes of Central Italy, which are comparatively of trifling dimensions, belong to a wholly different class. The most important of these, the Lacus Fucinus of the ancients, now called the Lago di Celano, which is situated almost exactly in the center of the peninsula, occupies (as has been already pointed out) a basin of considerable extent, surrounded on all sides by mountains, and without any natural outlet, at an elevation of more than 2,000 feet above the sea. Its waters have of late years been in great part carried off by an artificial channel, and more than half its surface laid bare. Next in size is the Lago Trasimeno, often called the Lago di Perugia, so celebrated in Roman history; it is a broad expanse of shallow waters, surrounded only by low hills, but about thirty miles in circumference. The neighboring lake of Chiusi is of similar character, but much smaller dimensions. All the other lakes of Central Italy, which are scattered through the volcanic districts west of the Apennines, are of a wholly different formation, and occupy deep, cup-shaped hollows, which have undoubtedly at one time formed the craters of extinct volcanoes. Such is the Lago di Bolsena, near the city of the same name, which is an extensive sheet of water, as well as the much smaller Lago di Vico (the Ciminian lake of ancient writers) and the Lago di Bracciano, nearer Rome, while again to the south of Rome the well-known lakes of Albano and Nemi have a similiar origin.

The only lake properly so called in Southern Italy is the Lago del Matese, in the heart of the mountain group of the same name, of very trifling extent. The so-called lakes on the coast of the Adriatic north and south of the promontory of Gargano are in fact mere brackish lagoons communicating with the sea.

Islands.—The three great islands of Sicily, Sardinia, and Corsica are so closely connected with Italy, both by geographical position and community of language, that they are frequently spoken of as the Italian Islands, but they will best be considered separately, and we shall here confine our attention to the smaller islands that lie scattered in the Mediterranean within sight of the coasts of Italy. Of these by much the most considerable is that of Elba, situated on the west coast of Central Italy, about fifty miles south of Leghorn, and separated from the mainland at Piombino by a strait of only about six miles in width. North of this, and just about midway between Corsica and Tuscany, is the small island of Capraja, steep and rocky, and only four and a half miles long, but with a secure port; Gorgona, about twenty-five miles farther north, is still smaller, and is a mere rock, inhabited only by a few fishermen. South of Elba are the equally insignificant islets of Pianosa and Monte Cristo, while the more considerable island of Giglio lies much nearer the mainland, immediately opposite the remarkable mountain promontory of Monte Argentaro, itself almost an island. Of a wholly different character are the islands that are found farther south in the Tyrrhenian Sea. Of these Ischia and Procida, both of them situated almost close to the northern headland of the Bay of Naples, are entirely of volcanic origin, as is the case also of the more distant group of the Ponza Islands. These are three in number—Ponza, Palmaruola, and Zannone; while Vandotena (also of volcanic formation) is about midway between Ponza and Ischia. The island of Capri, on the other hand, which is just opposite to the southern promontory of the Bay of Naples, is a precipitous limestone rock. The Æolian or Lipari Islands, a remarkable volcanic group, belong rather to Sicily than to Italy, though Stromboli, the most easterly of them, is about equidistant from Sicily and from the mainland. The islands to the south of Sicily—Malta and Gozo, and Pantellaria—in like manner do not fall within the scope of the present article. Malta indeed has very little natural connection with Sicily, and none with the continent of Italy.

The Italian coast of the Adriatic presents a great contrast to its opposite shores, for while the coast of Dalmatia is bordered by a succession of islands, great and small, the long and uniform coast-line of Italy from Otrantó to Rimini presents not a single adjacent island; and the small outlying group of the Tremiti Islands (north of the Monte Gargano and about fifteen miles from the mainland) alone breaks the monotony of this part of the Adriatic.

Climate and Natural Productions.

The geographical position of Italy naturally renders it one of the hottest countries in Europe. But the effect of its southern latitude is to a great extent tempered by its peninsular character, bounded as it is on both sides by seas of considerable extent, as well as by the great range of the Alps with its snows and glaciers to the north. Great differences also exist with regard to climate between Northern and Southern Italy, due in great part to other circumstances as well as to difference of latitude. Thus the great plain of Northern Italy is chilled by the cold winds from the Alps, while the damp warm winds from the Mediterranean are to a great extent intercepted by the Ligurian Apennines. Hence this part of the country has a cold winter climate, so that the thermometer descends as low as 10° Fahr., and the mean winter temperature of Turin is actually lower than that of Copenhagen. Throughout the region north of the Apennines no plants will thrive which cannot stand occasional severe frosts in winter, so that not only oranges and lemons, but even the olive-tree, cannot be grown, except in specially favored situations. On the other hand the strip of coast between the Apennines and the sea, known as the Riviera of Genoa, is not only extremely favorable to the growth of olives, but produces oranges and lemons in abundance, while even the aloe, the cactus, and the palm flourish in many places. Indeed, the vegetation of parts of this favored district has a more southern character than is met with again till below Terracina toward the south. The great plain of Lombardy, however, produces rice in large quantities, as well as Indian corn, millet, and wheat; while the mountain slopes both of the Alps and Apennines are covered with vast forests of chestnuts, and the lower hills are clothed with vineyards, which furnish abundance of wines, many of them of excellent quality. Silk is also an important article of produce both in the north of Italy and in Tuscany, and mulberries are largely planted with a view to its production.

Central Italy also presents striking differences of climate and temperature according to the greater or less proximity of the mountains. Thus the greater part of Tuscany, and the provinces from thence to Rome, enjoy a mild winter climate, and are well adapted to the growth of mulberries and olives as well as vines, but it is not till after passing Terracina, in proceeding along the western coast toward the south, that the vegetation of Southern Italy develops itself in its full luxuriance. Even in the central parts of Tuscany, however, the climate is very much affected by the neighboring mountains, and the increasing elevation of the Apennines as they proceed south naturally produces a corresponding effect upon the temperature. But it is when we reach the central range of the Apennines that we find the coldest districts of Italy. In all the upland valleys of the Abruzzi and of Sannio, snow begins to fall early in November, and heavy storms occur often as late as May; whole communities are shut out for months from any intercourse with their neighbors, and some villages are so long buried in snow that regular passages are made between the different houses for the sake of communication among the inhabitants. The district extending from the southeast of Lake Fucino to the Piano di Cinquemiglia, and inclosing the upper basin of the Sangro and the small lake of Scanno, is the coldest and most bleak part of Italy south of the Alps. Heavy falls of snow in June are not uncommon, and it is only for a short time toward the end of July that the nights are totally exempt from light frosts. Yet less than forty miles east of this district and even more to the north, we find the olive, the fig-tree, and the orange thriving luxuriantly on the shores of the Adriatic from Ortona to Vasto. In the same way, while in the plains and hills around Naples snow is rarely seen, and never remains long, and the thermometer seldom descends to the freezing point, twenty miles east from it in the fertile valley of Avellino, of no great elevation, but encircled by high mountains, light frosts are not uncommon as late as June; and eighteen miles farther east, in the elevated region of S. Angelo de' Lombardi and Bisaccia, the inhabitants are always warmly clad, and vines grow with difficulty, and only in sheltered places. But nowhere are these contrasts so striking as in Calabria. The shores, especially on the Tyrrhenian Sea, present almost a continued grove of olive, orange, lemon, and citron trees, which attain a size unknown in the north of Italy. The sugar-cane flourishes, the cotton-plant ripens to perfection, date-trees are seen in the gardens, the rocks are clothed with the prickly-pear or Indian fig, the inclosures of the fields are formed by aloes and sometimes pomegranates, the licorice-root grows wild, and the mastic, the myrtle, and many varieties of the oleander and cistus form the underwood of the natural forests of arbutus and evergreen oak. If we turn inland but five or six miles from the shore, and often even less, the scene changes. High districts covered with oaks and chestnuts succeed to this almost tropical vegetation; a little higher up and we reach the elevated regions of the Pollino and the Sila, covered with firs and pines, and affording rich pastures even in the midst of summer, when heavy dews and light frosts succeed each other in July and August, and snow begins to appear at the end of September or early in October. Along the shores of the Adriatic, which are exposed to the northeast winds, blowing coldly from over the Albanian mountains, delicate plants do not thrive so well in general as under the same latitude along the shores of the Tyrrhenian Sea.

Southern Italy indeed has in general a very different climate from the northern portion of the kingdom; and, though large tracts are still occupied by rugged mountains of sufficient elevation to retain the snow for a considerable part of the year, the districts adjoining the sea enjoy a climate similar to that of Greece and the southern provinces of Spain. Unfortunately several of these fertile tracts suffer severely from malaria, and especially the great plain adjoining the Gulf of Tarentum, which in the early ages of history was surrounded by a girdle of Greek cities—some of which attained to almost unexampled prosperity—has for centuries past been given up to almost complete desolation.

It is remarkable that, of the vegetable productions of Italy, many of those which are at the present day among the first to attract the attention of the visitor, and might be thought characteristic of the country, are of comparatively late introduction, and were wholly unknown in ancient times. The olive indeed in all ages clothed the hills of a large part of the country; but the orange and lemon, which now constitute so prominent a feature in the warmer districts of the peninsula, are a late importation from the East, while the cactus or Indian fig and the aloe, both of them so conspicuous on the shores of southern Italy, as well as of the Riviera of Genoa, are of Mexican origin, and consequently could not have been introduced earlier than the sixteenth century. The same remark applies to the maize or Indian corn, which is now so extensively cultivated in every part of Italy. Many botanists are even of opinion that the sweet chestnut, which now constitutes so large a part of the forests that clothe the sides both of the Alps and the Apennines, and in some districts supplies the chief food of the inhabitants, is not originally of Italian growth; it is certain at least that it had not attained in ancient times to anything like the extension and importance which it possesses at the present day.

It may have been gathered from the preceding sketch of the physical conformation and the climate of Italy that it is difficult to take a general view of the state of its agriculture. The cultivation of Lombardy differs from that of Calabria as much as that of Massachusetts does from that of Carolina. All that can be done therefore in this general description is to notice those results of agriculture which yield food, drink, or clothing to its inhabitants, or which form the basis of manufacturing industry or the rudiments of foreign commerce. The cereals form, as elsewhere in Europe, the chief aliment of the inhabitants; in Italy, however, the lower classes in many parts subsist much on maize and beans, which require little preparation to render them fit for food. In some of the southern provinces wheat is made use of by the same class, both in the form of bread and as macaroni, which is manipulated with great facility. Wheat and maize are, on the average of years, about equal to the consumption, but little can be spared for exportation; and in many of the ports depôts of foreign wheat are kept to meet the variations of seasons, or to be used as articles of commerce with other countries.

As Italy produces abundance of wine, and consequently needs neither beer nor grain-spirits, no barley is needed for these drinks, and scarcely any is cultivated. Oats are but little grown, but beans of various kinds are produced in abundance. Rye, the common breadcorn of the far greater portion of Europe, is only raised in a few spots in the very northernmost parts of Italy, where it is made into bread for the poor; while those of the higher classes there, as well as throughout the whole peninsula in the cities, make use of wheaten bread. Rice grows in many parts, in fact wherever there is a sufficiency of water to insure a good produce, at such a distance from towns as not to be injurious to the health of the inhabitants. A great variety of lupines are used as food, especially in the soups. In some parts of the mountainous regions chestnuts are a substitute for corn, and even form the principal food of the population. Fruits are plentifully used, particularly figs, grapes, and melons, as food; while the cheapness of onions, garlic, tomatoes or love-apples, and capsicums, renders them valuable as condiments. The potato, which is in such common use in other parts of Europe, has been but partially introduced into Italy; and, where it is cultivated, it occupies a very small proportion of the soil. Lettuces, asparagus, endive, artichokes and several kinds of turnips and of carrots are grown everywhere.

Animal food is far from being extensively used. The oxen yield in some parts excellent in others very indifferent meat. The mutton is neither good nor abundant, but has been much improved of late years. Swine furnish a plentiful supply during the winter months; they are also prepared as bacon or hams, and above all as sausages, the fame of which has reached America under the name of the city of Bologna, where they were early and extensively prepared. The large dairy farms in Lombardy also furnish great quantities of cheese of very superior quality, especially that known by the name of Parmesan.

The fisheries contribute largely to the supply of food in Italy, though, from the number of fasts countenanced by the Catholic Church, not enough for the consumption; and the deficiency is procured by commerce with the English, French and Americans, who convey to the seaports salted codfish from the banks of Newfound land. The native fisheries on the coast give much occupation; the most considerable are those for the tunny, a very large fish, and for the anchovy, a very small one. These are conducted upon a large scale by joint-stock companies. The lakes and rivers also yield some, though not a great proportion, of that kind of food which ecclesiastical restrictions render indispensable.

The sugar-cane is not cultivated in the south of Italy, as it is found that in point of strength, as well as of cost, the sugar made from it does not succeed in competition with that imported from the West Indies.

The products of agriculture are sufficient for the clothing of all its inhabitants; for, though wool is in general neither good nor plentiful, hemp and flax are grown everywhere, and are manufactured at home; and, from the nature of the climate, linen can be substituted for woolen dress during most of the months of the year. Some cotton is grown in the southern divisions of Italy, but not sufficient to furnish materials for their inconsiderable manufactures of that article.

The chief product of Italian agriculture is silk. It is produced in every part, and much of it is converted into articles of dress or of furniture, where it is collected; but the chief production of it is in the Neapolitan provinces and Lombardy, whence the looms of England, Austria, Russia, and Germany are supplied. The value of this commodity exceeds that of all the other productions of Italy which are exported to foreign countries. The manufacture has of late years made great progress, which it is still steadily maintaining, and the great increase which has taken place in the propagation of the mulberry tree has, within the last fifty years, increased the quality of raw silk to an extent that had never before been dreamed of.

Another very important Italian product, which is partly used as food, partly employed in home manufactures, and extensively exported as an article of foreign commerce, is the oil of the olive tree. It is used as a substitute for butter in the south, and even to a great degree supplies the place of milk, which is comparatively little used in the peninsula. It is exported to England for use with various fabrics, and as a table luxury. The planting and watching cost but little labor or expense, and in a few years the income more than repays the labor. The best olive oil is produced near Genoa, in Lucca, in Tuscany and in Calabria; but it is plentiful throughout the whole of Italy, except in Lombardy and in Piedmont.

The wines of Italy are not very highly valued in other countries, and almost the whole that is produced is consumed at home. Yet there is little doubt that with more care in the culture and preparation they might rival those of the best parts of Europe.

The mineral productions of Italy are of comparatively small value; but the copper mines of Tuscany, which were extensively wrought in ancient times, are still worked to a considerable extent. The iron of Elba, so celebrated in antiquity, still bears a high character for its excellent quality, but the quantity produced is limited. Many marbles of superior quality are found in different parts of the Apennines, of which the white statue marble of Carrara is the most celebrated. Alabaster also abounds in Tuscany. Coal is wanting in all parts of the peninsula, which must ever be a great drawback to the prosperity of Italy.

Consolidation of Italy.—The name of Italy was originally applied only to the southermost part of the peninsula, and was only gradually extended so as to comprise the central regions, such as Latium and Campania; which were designated by writers as late as Thucydides and Aristotle as in Opicia. The progress of this change cannot be followed in detail, but there can be little doubt that the extension of the Roman arms, and the gradual union of the nations of the peninsula under one dominant power, would contribute to the introduction, or rather would make the necessity felt, for the use of one general appellation. At first indeed the term was apparently confined to the regions of the central and southern districts, exclusive of Cisalpine Gaul and the whole tract north of the Apennines, and this continued to be the official or definite signification of the name down to the end of the republic. But the natural limits of Italy are so clearly marked that the name came to be generally employed as a geographical term at a much earlier period. Thus we already find Polybius repeatedly applying it in this wider signification to the whole country, as far as the foot of the Alps; and it is evident from many passages in the Latin writers that this was the familiar use of the term in the days of Cicero and Cæsar. The official distinction was, however, still retained. Cisalpine Gaul, including the whole of Northern Italy, still constituted a "province," an appellation never applied to Italy itself. As such it was assigned to Julius Cæsar, together with Transalpine Gaul, and it was not till he crossed the Rubicon that he entered Italy in the strict sense of the term.

Augustus was the first who gave a definite administrative organization to Italy as a whole, and at the same time gave official sanction to that wider acceptation of the name, which had already established itself in familiar usage, and which has continued to prevail ever since.

The division of Italy into eleven regions, instituted by Augustus for administrative purposes, which continued in official use till the reign of Constantine, was based mainly on the territorial divisions previously existing, and preserved, with few exceptions, the ancient limits.

The first region comprised Latium (in the more extended sense of the term, as including the land of the Volscians, Hernicans, and Auruncans), together with Campania and the district of the Picentini. It thus extended from the mouth of the Tiber to that of the Silarus.

The second region included Apulia and Calabria (the name by which the Romans usually designated the district known to the Greeks as Messapia or Iapygia), together with the land of the Hirpini, which had usually been considered as a part of Samnium.

The third region contained Lucania and Bruttium; it was bounded on the west coast by the Silarus, on the east by the Bradanus.

The fourth region comprised all the Samnites (except the Hirpini), together with the Sabines and the cognate tribes of the Frentani, Marrucini, Marsi, Peligni, Vestini, and Æquiculi. It was separated from Apulia on the south by the river Tifernus, and from Picenum on the north by the Matrinus.

The fifth region was composed solely of Picenum, extending along the coast of the Adriatic from the mouth of the Matrinus to that of the Æsis, beyond Ancona.

The sixth region was formed by Umbria, in the more extended sense of the term, as including the Ager Gallicus, along the coast of the Adriatic from the Æsis to the Ariminus, and separated from Etruria on the west by the Tiber.

The seventh region consisted of Etruria, which preserved its ancient limits, extending from the Tiber to the Tyrrhenian Sea, and separated from Liguria on the north by the river Macra.

The eighth region, termed Gallia Cispadana, comprised the southern portion of Cisalpine Gaul, and was bounded on the north (as its name implied) by the river Padus or Po, from above Placentia to its mouth. It was separated from Etruria and Umbria by the main chain of the Apennines; and the river Ariminus was substituted for the far-famed Rubicon as its limit on the Adriatic.

The ninth region comprised Liguria, extending along the seacoast from the Varus to the Macra, and inland as far as the river Padus, which constituted its northern boundary from its source in Mount Vesulus to its confluence with the Trebia just above Placentia.

The tenth region included Venetia from the Padus and Adriatic to the Alps, to which was annexed the neighboring peninsula of Istria, and to the west the territory of the Cenomani, a Gaulish tribe, extending from the Athesis to the Addua, which had previously been regarded as a part of Gallia Cisalpina.

The eleventh region, known as Gallia Transpadana, included all the rest of Cisalpine Gaul from the Padus on the south and the Addua on the east to the foot of the Alps.

The arrangements thus established by Augustus continued almost unchanged till the time of Constantine, and formed the basis of all subsequent administrative divisions until the fall of the Western Empire. It is not worth while to follow in detail the changes introduced during the fourth century. It was the invasion of the Lombards that first broke up the general system of the Roman administration, and prepared the way for the redistribution of Italy in the Middle Ages on a wholly different basis.

STATISTICS.

The preceding sections have dealt with Italy the country as a permanent physical unity; here it is proposed to consider Italy the kingdom as a modern political and social unity. In dealing with the various aspects of the subject we shall be continually reminded of the fact that Italy is one of the very youngest of the greater nations of Europe. In attempting to trace back the movement of any department of social activity, the investigator here finds his retrospect soon interrupted and closed; instead of the statistics of the kingdom of Italy he has only the statistics, fragmentary and incapable of comparison, of the several states by whose incorporation it has been formed. Wherever money is given here in lire, the amount may be approximated in American dollars by dividing by five.

Extent.—Of the Italian frontier 294 miles coincide with that of France, 355 with that of Switzerland, and 269 with that of Austria. Owing mainly to natural causes, but partly also to political traditions, the line is a very irregular one; and at various points it has been subjected to rectifications on a small scale since the consolidation of the kingdom. The limits toward France are determined by the convention signed at Turin in 1861. The same year saw the revision of the line between Lombardy and Ticino on the basis of the treaty of Varese, 1752. In 1863 the boundary of the Grisons was slightly modified, and the Lei valley assigned to Italy. In 1873 the frontier was fixed between Teramo and Brusio and at the Alp de Cravairola; and in 1875 a district of 4,324 acres, or nearly seven square miles, which had been in dispute, was assigned to Italy by the arbitration of the United States, and incorporated with the province of Novara. On the surrender of the Austrian provinces of Italy to the new kingdom in 1867, it was decided that the frontier between the two states should be that of the actual administration of the Lombardo-Venetian kingdom.

The total area of the kingdom of Italy is given officially as 110,646 square miles.

Territorial Divisions.—The kingdom is divided into the following sixteen compartimenti. These compartimenti are subdivided into sixty-nine provinces, with a total population (1901) of 32,449,754.

1. *Piedmont:* Alessandria, Cuneo, Novara, Turin.
2. *Liguria:* Genoa, Porto Maurizio.
3. *Lombardy:* Bergamo, Brescia, Como, Cremona, Mantua, Milan, Pavia, Sondrio.
4. *Venice:* Belluno, Padua, Rovigo, Treviso, Udine, Venice, Verona, Vicenza.

5. *Emilia:* Bologna, Ferrara, Forli, Modena, Parma, Piacenza, Ravenna, Reggio.
6. *Umbria:* Perugia.
7. *Marches:* Ancona, Ascoli Piceno, Macerata, Pesaro-Urbino.
8. *Tuscany:* Arezzo, Florence, Grosseto, Leghorn, Lucca, Massa-Carrara, Pisa, Siena.
9. *Latium:* Rome.
10. *Abruzzi and Molise:* Aquila, Campobasso, Chieti, Teramo.
11. *Campania:* Avellino, Benevento, Caserta, Naples, Salerno.
12. *Apulia:* Bari, Foggia, Lecce.
13. *Basilicata:* Potenza.
14. *Calabrias:* Catanzaro, Cosenza, Reggio.
15. *Sicily:* Caltanisetta, Catania, Girgenti, Messina, Palermo, Syracuse, Trapani.
16. *Sardinia:* Cagliari, Sassari.

Vital Statistics.—Previous to 1871 we have no census for the whole kingdom of Italy, seeing that at the previous census of 1861 the Roman territory was not yet incorporated. Approximate totals are obtainable for earlier dates by summing up the returns for the Sardinian kingdom, the Lombardo-Venetian kingdom, etc., not indeed belonging to the same year, but separated from each other by comparatively slight intervals. It is thus estimated that the growth of the population of the territory now forming the kingdom is represented with some approach to accuracy in the following table:—

1770	14,689,317	1838	21,975,205
1795	16,256,974	1848	23,617,153
1800	17,237,421	1858	24,857,417
1816	18,380,995	1861	25,016,801
1825	19,726,977	1901	32,500,000

In spite of the fact that the great mass of the Italian population is engaged in agricultural pursuits, an unusual proportion of the inhabitants are congregated in towns. The Italian is no lover of the country; he dreads, of all things, an isolated dwelling. If he cannot live in the capital, then in a provincial city; if not, in a country town; then in a village—only not in a country house. Landowners, farmers, and most of the laborers huddle together in their squalid boroughs and hamlets; and the peasants have often a journey of several miles before they reach the fields intrusted to their care, though this tendency is indeed now less marked than formerly. At the same time the number of very large cities is comparatively small. At the census of 1871 Naples ranked first with a communal population of 448,335; and there were twenty-two other towns whose inhabitants numbered about 50,000 or upward. With the exception of four belonging to Sicily, the greater number of these were situated in the north.

Agriculture.—In the wide sense of the word, Italy is emphatically an agricultural country, and the products of its agriculture are of a very varied order. If the ratio of its grain production to the number of its population, however, be compared with the same ratio in other countries, it is surpassed by Roumania, Denmark, Russia, Prussia, France, Hungary, etc., and in fact is only a little better than Switzerland. It is calculated that about 11,545,594 acres are devoted to the cultivation of wheat, and that the annual return is about 142,402,513 bushels. The average per acre is thus very low, only twelve bushels. Next in importance to wheat comes maize, the most recently introduced of the cereals; it occupies 4,192,083 acres, and yields 85,506,660 bushels. That the cultivation of rice is less widely distributed is the natural result of the fact that it requires about 107,000 gallons of water per annum for every acre, and that its cultivation is found in many places to be extremely prejudicial to the healthiness of the locality; in certain favorable regions, however, it forms the predominant crop. The chief seat of this cereal is Novara, and more particularly the circondario of Vercelli, which alone yields about 6,875,000 bushels of rice in a year. The total acreage is 573,925 acres, with a total production of 26,998,915 bushels. Neither barley nor rye is of great importance, the 1,148,470 acres devoted to their cultivation giving 18,417,542 bushels as an average crop. More than a fourth of the acreage, and nearly a third of the produce, belong to Sicily. Oats occupy about 984,917 acres, and the return is 19,369,000 bushels. The best crops are obtained in the provinces of Caserta, Pisa, Benevento, Milan, and Foggia. Millet and sorghum are mainly employed as forage—the first of the three, which was formerly of importance as an article of human food, having been in that regard displaced by maize. Buckwheat is hardly grown outside of the provinces of Cuneo, Como, Belluno, and Treviso. The manufacture of maccaroni and similar foodstuff is well known as a characteristic Italian industry. It is pretty extensively distributed, and is often carried on in very primitive fashion. The extent of the industry may be judged from the fact that, while the Italians themselves consume enormous quantities, they are at the same time able to export from 50,000 to 70,000 quintals of "pastes."

The potato is now found as a common object of cultivation in nearly every region of Italy except the provinces of Mantua, Girgenti, and Trapani. It is calculated that the total crop of potatoes may average 19,387,000 bushels. Turnips are pretty largely grown, more especially in the central districts of the peninsula, for use as winter fodder for the cattle. Many attempts have been made to introduce the cultivation of beet, but the plant does not succeed to much satisfaction.

The vine is cultivated throughout the length and breadth of Italy, but in not a few of the provinces its relative importance is slight. While in some of the districts of the south and the center the vine occupies from 10 to 20 per cent. of the cultivated area, in some of the northern provinces, such as Sondrio, Belluno, Grosseto, etc., the average is only about 1 or 2 per cent. The methods of cultivation are sufficiently varied; but the planting of the vines by themselves in long rows of insignificant bushes is decidedly the exception. In Lombardy, Emilia, Romagna, Tuscany, the Marches, Umbria, the Terra di Lavoro, and other southern provinces, they are trained to trees which are either left in their natural state or subjected to pruning and pollarding. In Campania and Terra di Lavora the vines are allowed to climb freely to the tops of the poplars much as they would do in their native woods; but the wines obtained by this system of cultivation are said to be of inferior quality. In the rest of Italy the elm and the maple are the trees mainly employed as supports. Artificial props of several kinds—wires, cane-work, trellis-work, etc.—are also in use in many districts, and in some the plant is simply permitted to trail along the ground. The vintage takes place, according to locality and climate, from the beginning of September to the beginning of November.

Next to the cereals and the vine the most important object of cultivation in Italy is the olive. In Sicily and the provinces of Reggio, Catanzaro, Cosenza, and Lecce this tree flourishes freely and without shelter; as far north as Rome, Aquilla, and Teramo it requires only the slightest protection; in the rest of the peninsula it runs the risk of damage by frost every ten years or so. The proportion of ground under olives is no less than from 20 to 36 per cent. at Porto Maurizio, and in Reggio, Lecce, Bari, Chieti, and Leghorn it averages from 10 to 19 per cent. Throughout Piedmont, Lombardy, the Veneto, and the greater part of Emilia, the tree is of little importance, though in a number of the provinces it is cultivated on a small scale. In the olive there is great variety of kinds, and the methods of cultivation differ greatly in different districts; in Bari, Chieti, and Lecce, for instance, there are regular woods of nothing but olive-trees, while in middle Italy we have olive-orchards with the interspaces occupied by crops of various kinds. The Tuscan oils from Lucca, Calci, and Buti are considered the best in the world; and those of Bari, Umbria, and western Liguria rank next.

The cultivation of oranges, lemons, and their congeners is of somewhat modern date, the introduction of the *Citrus Bigaradia* being probably due to the Arabs; but it has received so great a development in certain parts of the country as to be highly characteristic. Sicily stands *facile princeps* in this respect. Reggio, Calabria, Catanzaro, Cosenza, Lecce, Salerno, Naples, and Caserta are the continental provinces which come next after Sicily. In Sardinia the cultivation is extensive, but receives little attention. Crude lime-juice is exported from Italy to the amount of about 10,000 quintals annually, and concentrated lime-juice to the amount of from 11,000 to 17,000 quintals. Essential oils are extracted from the rind of the agrumi, more particularly from that of the lemon and the bergamot; the latter, however, is almost confined to the province of Reggio Calabria, where the average production amounts to 220,000 pounds—an enormous quantity when it is remembered that 1,000 bergamots are required for every pound. A perfume called *acqua nanfa*, or *lanfa*, is obtained from the distillation of the orange-flowers, and the petals are also made into a conserve at Syracuse. Of the agrumi in their natural state the exportation has increased. In Southern Italy almonds, carob-trees, and figs are cultivated on a very extensive scale. Walnuts are mainly grown in Piedmont, and particularly in the province of Cuneo; hazels, on the contrary, have their greatest diffusion in the south, and particularly in the island of Sicily and the province of Avellino.

In the matter of implements the Italian agriculturist is far behind. The old Roman plow, for instance, as it is described by Virgil and Columella, may still be seen in use in various parts of the country; in Sardinia the plow that figures on the ancient monuments of the island might have been copied from that at work in the fields. Great improvements, however, have taken place in the more progressive regions; iron has replaced wood, and coulter and share have been increased in massiveness. But even in the Veneto the heavy plow drawn by as many it may be as six pair of oxen cuts the furrow no deeper than nine inches.

Though Italy is so distinctively an agricultural country, and has been subject so long to regular process of cultivation, a large proportion of its arable land is still in a state of utter neglect. It is calculated that the aggregate of the more important districts ready to give abundant increase in return for the labor of reclamation amounts to 571,000 acres; and more than twice that quantity might be utilized. The most important works undertaken in this direction since the formation of the kingdom are the drainage of Lago Fucino and Lago Trasimeno, and the great scheme for the improvement of the "Agro Romano" decreed by parliament on December 11, 1878.

The breed of cattle most widely distributed throughout Italy is that known as the Podolian, usually with white or gray coat and enormous horns. In the Alpine districts there is a stock quite distinct from the Podolian, generally called *razza montanina*. These animals are much smaller in stature and more regular in form than their Podolian cousins; and they are mainly kept for dairy purposes.

Sheep are not reared in any considerable numbers by the agriculturists of Italy; but enormous flocks are possessed by professional sheep-farmers, who pasture them in the mountains in the summer, and bring them down to the plains in the winter. The breeds vary from region to region. At Saluzzo in Piedmont there is a stock with hanging ears, arched face, and tall stature, kept for its dairy qualities; and in the Biellese the merino breed is maintained by some of the larger proprietors. In the upper valleys of the Alps there are many local varieties, one of which at Ossola is like the Scotch blackface. Liguria is not much adapted for sheep-farming on a large scale; but a number of small flocks come down to the plain of Tuscany in the winter. With the exception of a few sub-Alpine districts near Bergamo and Brescia, the great Lombard plain is decidedly unpastoral. The Bergamo sheep is the largest breed in the country; and that of Cadore and Belluno approaches it in size.

The north of Italy has long been known for its great dairy districts. Parmesan cheese, otherwise called Lodigiano (from Lodi) or grana, was presented to King Louis XII. as early as 1509.

Among the various methods by which the relation of the landholder to the tiller of the soil is regulated, the more noteworthy are the mezzadria (mezzeria or metayer) system, the boaria or schiavenderia, the economia, and the affittanza or affittamento. This last is practically the same as the ordinary renting system in England and Scotland, the rent sometimes being paid in money, sometimes in kind, sometimes partly in money and partly in kind, and the periods varying from one year to leases of six or nine years. In the typical mezzadria the owner receives frequently one-half of the produce of the soil, and the mezzadro, or farmer, the other; but, of course, there are many minor modifications in the terms of the contract. The live stock is usually the property of the mezzadro, who pays a fixed rent for the use of the pasturage. By the terzeria system, on the other hand, the animals and plant are the property of the landholder, or two-thirds his and one-third the tenant's. Under the schiavenderia or boaria system, the boario (so called from his care of the cattle) receives such a quantity of the produce of the soil or of money as pays for his labor, and the landlord remains practically his own farmer. The live stock, of course, is the landlord's property, but the boario has a right to certain perquisites connected with this department of his labor. Economia is the name given to a system by which "the holder of the land, whether landlord or tenant, pays certain families who perform under his direction, with his capital and at his risk, the various labors of cultivation."

Manufactures.—Though Italy is preëminently an agricultural country, its manufacturing industries are of considerable importance, and some of them have a long and varied history. Of chief note is the silk trade—though it has suffered greatly from the silkworm disease, which broke out in 1854. According to De Vecchi the total annual production of raw silk in Italy previously amounted to 7,612,000 pounds; in 1865 it was reduced to 3,876,400 pounds, but it has since materially recovered its ground. The average, indeed, for the ten years 1868-77 is given by the same authority as 5,753,888 pounds; and according to the report of Luigi Maccia to the Milan chamber of commerce in 1881 the cocoon harvest amounted in 1878 to 81,843,740 pounds, in 1879 to 41,648,200 pounds, and in 1880 to 79,546,280 pounds, which would represent in round numbers 5,500,000 pounds of raw silk for the first year, 2,798,000 pounds for the second, and 5,345,000 for the third.

Since that time the increase has been steady and marked.

As a silk-producing country in fact Italy ranks second only to China, and leaves all its other competitors far behind. The culture is carried on in at least 5,300 communes, and men, women, and children are employed in the unwinding of the cocoons—an operation which was formerly effected for the most part by the growers themselves, but has now passed into the hands of those who can bring better appliances and more modern methods to bear. The district in which the unwinding is most extensively carried on is Lombardy, and it is there, too, that improvements in the process are most widely adopted; while in the Veneto, for example, there are 10,031 of the old-fashioned ovens to 4,698 of the modern steam apparatuses; in Lombardy the latter number 29,576 and the former only 9,305.

The raw material for the silk-throwing factories is partly obtained from abroad, in spite of the large home supply already indicated; for a considerable portion of this—though much less than was formerly the case—is exported for manufacture at Lyons and elsewhere.

Next in importance to the silk industry stands the cotton manufacture. During the American war the cultivation of cotton in Italy received a remarkable but temporary stimulus. In 1864 it occupied about 227,645 acres, and the produce amounted to 622,896 quintals, but the corresponding figures for 1873 were only 85,422 acres and 180,230 quintals. Liguria and Piedmont contain the greatest number of spinning mills. In the number of its cotton looms, however, Lombardy stands highest, and Liguria, Piedmont, and Campania follow. The total number for the country is stated at more than 13,000.

As has been already seen, Italy is a great wool-growing country; and while it exports about 1,760,000 pounds of the native produce, it imports, mainly from South America, a quantity varying from 10,382,680 pounds to 18,983,600 pounds.

The flax and hemp industries have been prosecuted in Italy for centuries; but a large proportion of the manufacture is still carried on by hand-loom weavers working in their own houses—to the number probably of more than 68,000.

Owing to the abundance of the raw material, Italy has long been successful in the manufacture of paper from linen rags according to the old-fashioned processes; and the development of the more modern methods has been fostered by the ready availability of water power, though on the other hand the outlays for chemicals, machinery and fuel are serious drawbacks. The supply of home-made paper is far in excess of the demand, and there is a corresponding excess of export over import, more especially in blotting and packing papers. The imported paper is almost exclusively of the finer qualities. According to Signor Avondo, the annual quantity of rags obtained in Italy is 88,000,000 pounds. There was formerly a great export of rags to America in the shape of packing material for marble blocks.

In the manufacture of leather and skins Italy has long been successfully engaged; and though the industry has now to compete with the new enterprise of India and America, the annual production is valued at £4,000,000.

A private company, established in 1868 under the name of Regia Cointeressata, secured the exclusive privilege of manufacturing and selling tobacco in continental Italy and Sardinia, on condition of paying to the state an annual rent and a certain proportion of the gains after the rent was deducted. This company has recently, by limitation, gone out of existence.

According to the regulation of 1879 the cultivation of tobacco for exportation is permitted in any part of the country on payment of a license, while the cultivation for the inland monopoly is restricted to certain regions annually determined, and within these regions no cultivation for export can be carried on. The rules are of a very rigid description.

The manufacture of oils is among the most flourishing of the minor industries, and the demand which it makes on foreign countries for supplies of raw material is rapidly increasing.

The sugar manufacture is of limited extent.

There are numerous distilleries in the country, and a few manufactories of aërated waters. The brewing establishments are not very numerous, and only a limited quantity of beer is made. Both barley and hops are largely imported from abroad, the hops mainly from Austria and Germany.

The iron manufacture has increased in importance in Italy during the last decade.

In the various ceramic arts Italy was at one time unrivaled, but the ancient tradition has long lost its primeval impulse; and even where the industry remains the art has for the most part perished.

The jewelers' art as a matter of course received large encouragement in a country which had so many independent courts; but nowhere has it attained a fuller development than at Rome. A vast variety of trinkets—in coral, glass, lava, etc.—is exported from Italy, or carried away by the annual host of tourists. The copying of the paintings of the old masters is becoming an art industry of no small mercantile importance in some of the larger cities.

The production of mosaics is an art industry still carried on with much success in Italy, which indeed ranks exceedingly high in the department. The great works of the Vatican are especially famous (more than 17,000 distinct tints are employed in their production), and there are many other establishments in Rome. The Florentine mosaics are perhaps better known abroad; they are composed of larger pieces than the Roman. Those of the Venetian artists are remarkable for the boldness of their coloring.

Fisheries.—As the coast-line of Italy extends to about 3,937 miles (of which 1,048 belong to the islands), the prosecution of the fisheries in the neighboring seas is carried on from a great many points.

The anchovy and sardine fisheries are carried on by Italian boats, not only on the Ligurian and Tuscan coasts, but on those of France, Spain, Barbary, Dalmatia and Istria. Among the stations which take an active share in this department are Sestri and Riva, Cecina and Castiglione, Porto Ercole, Porto Longone in Elba, Ancona and Chioggia. The success of the fishermen is now seldom so great as it was before 1868; and two lire per day is the most that can be gained in the best months at the better stations. The annual value of the sardines brought to Terracina is stated at 6,300 lire, and that of the anchovies at 7,000; and the corresponding figures for Porto d'Anzio and Palermo are respectively 98,000 and 32,000 lire, 200,000 and 400,000. Civita Vecchia has a total for the two kinds of 15,000 lire.

Sword-fish (*Xiphias gladius*) are not only constantly caught in the nets of the tunny-fishers, but from time immemorial have been the object of special pursuit, the weapon mainly used against them being a species of harpoon or *draffineria*. As many as fifty fish may be caught in a single day off the coast of Sicily, and twenty off the coasts of Calabria. Each fish weighs on an average from 220 to 440 pounds; and the quantity captured in the season in the two districts indicated may amount to 308,000 pounds.

Coral is obtained in various parts of the Italian waters, more especially in the neighborhood of the island of Elba and the Gulf of Naples, and the Italian coral fishers extend their voyages to the African coast and the islands of Cape Verd. The hardships endured by the more adventurous fishers are extremely severe, and the gain is comparatively slight.

Of special importance are the lagoon fisheries of Orbetello, of the Mare Piccolo of Taranto, the Lago Verzimino or Salpi, and the Lago di Varano, and more particularly of Comacchio. Eels, soles, mullets, and various other kinds of fish are there obtained in enormous quantities.

Condition of the Lower Classes.—Though mitigated to some degree by the mildness of the climate and the cheapness of certain articles of food, pauperism in its most painful forms is a widespread evil in Italy. At Venice, out of a total population of 152,000, 36,000 are regular recipients of official charity. The slums of Naples are foul and overcrowded. Nor is the destitution confined to the cities. The condition of the agricultural laborers is in many cases deplorable. In the districts of Como, Milan, Pavia, and Lodi, the food of the contadino consists of maize bread, badly cooked, heavy and rancid, and thin soup composed of rice or "pasta" of inferior quality and vegetables often old and spoiled. In Southern Italy, says Villari, the peasants live in miserable houses, with a sack of straw for their bed, and black bread for their sole sustenance. Maize is the general food-stuff in the northern and central provinces, but begins to be rarer in Tuscany and Rome; it is again widely diffused in the upper provinces of Naples; but in Calabria and Apulia it forms the principal nutriment of scarcely a fourth of the communes, and in Sicily it disappears almost completely. In Piedmont, Lombardy, and the Veneto it is used mainly in the form of polenta, but also in the form of bread, and in the Napoletano in the form of a finer kind of polenta. Lombardy, the Veneto, Emilia, and the Marches are the regions where wheaten bread is least employed by the peasants. Barley is mainly consumed in Apulia and Calabria, rye in Sicily and Lombardy. In certain communes of the Marches and the Abruzzi acorns constitute the ordinary diet of the poor. Wheaten pastes are most extensively employed by the people in Liguria, Sicily, and the upper Neapolitan provinces. Animal food holds but little place in the dietary of the poor; and even in the house of the well-to-do peasant butcher-meat appears but seldom. According to Doctor Raseri, who has investigated the point by means of the customs returns and similar statistics, Sardinia is the region where animal food is most largely employed, and Sicily that where it is least.

Wine is naturally the prevailing drink throughout the country; but the extent of the consumption varies greatly from region to region, the average in the Roman province, Umbria, and Sardinia much exceeding that in the provinces of Naples and in Sicily. The use of alcohol is greatest in the Lombardo-Venetian cities; and it is there only that beer is of importance as a beverage. Cases of accidental death and of insanity attributable to the misuse of stimulants are much more frequent in the north than in the south or center, and in both respects Liguria has an unenviable preëminence.

The interest of the Italians is gradually being aroused in the sanitary condition of their cities and towns. Many of the provincial capitals and cathedral cities are portentously filthy. Drainage and sewage works, however, are becoming matters of concern to a number of the more important communes; and such cities more especially as Naples and Catania are bestowing much attention on the subject.

Commerce.—The extent of its coast and the numbe and excellence of its ports and harbors, the relation which it holds to the other countries of the Mediterranean seaboard, and the railway communication which it now possesses with the Transalpine lands combine to give Italy an important place as a trading-country—a place which would have been more important if all departments of activity had not fallen into so sad a state during the long period of its political decadence. In a country with a population comparatively so dense, and with so large a number of considerable cities as we have seen Italy to possess, it is evident on the face of it that the internal trade must amount to no small aggregate; but the simple agricultural life which is led by a large proportion of the inhabitants, the capacity which many regions possess of satisfying the demands of local consumption, limited at once in volume and variety, and the lack in many cases of free and frequent means of communication tend to restrain the scope and complexity of this interchange. That both the internal trade and the foreign commerce of Italy are in process of rapid development it is impossible to doubt. Of the former movement some idea may be obtained from the railway statistics, which, however, owing to the incompleteness of the system, furnish a less accurate representation of the facts than similar statistics in the case of older nations. That the foreign commerce is on the increase is shown by the following statement of the exports, imports, and transit trade from 1871 to 1900:

YEAR.	Imports.	Exports.	Transit Trade.
	lire.	lire.	lire.
1871	963,698,441	1,085,459,567	128,350,140
1872	1,186,611,328	1,167,201,119	121,172,403
1873	1,273,044,646	1,162,153,012	174,551,904
1874	1,275,206,783	985,458,532	215,277,553
1875	1,201,963,663	1,033,681,104	78,928,104
1876	1,313,841,108	1,216,844,813	102,547,875
1877	1,151,222,784	979,162,785	92,182,912
1878	1,070,637,230	1,045,301,302	80,950,387
1879	1,261,651,423	1,106,919,278	96,986,244
1900	1,700,235,665	1,338.246,253	....

Of the foreign nations that are engaged in the shipping trade of the Italian ports Great Britain has by far the most important share (7,669 vessels, of 5,950,279 tons burden); next comes France (4,256 vessels, 2,061,973 tons); third, but at an enormous distance, is Austria, and fourth Greece.

The government undertakes the engineering works necessary for the improvement and maintenance of the harbors of the first three classes, and it further subsidizes the communes which have to maintain the harbors of the fourth class.

Shipbuilding.—The district which shows the greatest activity in shipbuilding and produces the greatest number of large vessels is that of Genoa. This industry continued to increase in importance in Italy from the foundation of the kingdom till 1869 (683 vessels, 96,010 tons); in the next three years there was a decline; by 1875 the figures of 1869 were again almost reached, but since then there has been a very notable decrease.

Railways.—The first railway opened in Italy was a line, constructed in 1840, between Naples and Castellamare. The increase of railroads has since been rapid and there are now (1900) about 9,810 miles of line in operation.

The navigable canals have an aggregate length of about 663 miles, and the navigable portions of the rivers an aggregate length of 1,100.

The postal and telegraph systems are rapidly on the increase, but the country is yet considerably behind the other principal nations of Europe.

Army and Navy.—By the law of June 7, 1875, all men capable of bearing arms are under obligation of military service from their twenty-first to the end of their thirty-ninth year. They are divided into three categories: the first and second consist of those who are to serve successively in the standing army, in the mobile (*Milizia mobile*, equivalent to the Prussian *Landwehr*), and in the territorial militia (equivalent to Prussian *Landsturm*); the third serve in the territorial militia only. The men of the first category, that is, those who draw the first numbers in the conscription, serve eight or nine years in the regular standing army, four or five years in the mobile, and seven years in the militia, or, in the case of the cavalry, nine years in the regular army and ten in the militia—the infantry spending three years and the cavalry five years under arms, and for the rest of their time forming the active reserve. The men of the second category, that is, those who do not draw the first figures at the conscription, serve five or six years in the regular army, four or three years in the mobile, and the remainder of their term in the militia. They only require to be in arms five months, and these months may be distributed over several years.

Those conscripts who pass a certain examination and pay 1,500 lire (in the cavalry 2,000) are required to spend only one year with their regiments, and are further permitted, like the university students, to put off their year of service till they are twenty-six years of age.

In 1900 the strength of the army was:

Regular army (peace footing)	263,684
" " (war ")	492,255
Movable militia	319,693
Local "	2,233,018
Total military strength	3,308,650

The annual cost of the Italian army is slight as compared with that incurred by other countries; but compared with the resources of Italy it wears a totally different aspect.

For navy organization the coast regions are divided into three departments (Spezia, Naples, and Venice) and twenty-two conscription districts. About 16,000 or 18,000 men are enrolled yearly, and 18,000 have unlimited furlough.

The navy consists (1890) of 228 vessels; twenty-one iron-clads (some of most powerful type); fifteen torpedo vessels and 156 torpedo boats.

Religion.—The Roman Catholic Church claims the great mass of the Italian population; but, besides the ordinary Latin rite, several others are recognized in the country. The Armenians of Venice maintain their traditional characteristics. The Albanians of the southern provinces still employ the Greek rite and the Greek language in their public worship, and their priests, like those of the Greek Church, are allowed to marry. And certain peculiarities introduced by St. Ambrose distinguish the ritual of Milan from that of the general church. Up to 1871 the island of Sicily was, according to the bull of Urban II., ecclesiastically dependent on the king, and exempt from the canonical power of the pope.

Though the territorial authority of the papal see was abolished in 1870, the fact that Italy, and Rome more particularly, is the seat of the administrative center of the vast organization of the church is not without significance to the nation. In the same city in which the administrative functions of the body politic are centralized there still exists the court of the spiritual potentate with a total personnel of about 2,000 souls.

The number of episcopal dioceses in Italy is 265; but as it sometimes happens that more than one is subject to the same bishop, the number of these functionaries is somewhat less. Every diocese has full individuality as a corporation, and possesses a cathedal with a chapter of canons, a number of minor benefices, and a seminary.

The only Protestant denomination with a true historical position in Italy is that of the Waldensians, which has taken advantage of the religious liberty of the new kingdom to come down from the mountain fastnesses. The "Free Italian Church," founded in 1870 by twenty-three churches which declared themselves independent of the Waldensian organization, consists of thirty-six churches and thirty-five stations; and since 1876 it has a theological college in Rome. In a number of the larger cities of Northern and Central Italy there are considerable congregations of the "Free Christian Church," a community or "brotherhood" which believes that stated ministers and church statistics are both un-Christian. The Wesleyan Methodist Church, having carried on evangelizing operations in Italy since 1861, has several churches and stations with a respectable number of communicants, and in its elementary schools over 2,000 scholars. Of less extent are the more modern attainments of the American Episcopal Methodists, the American Baptists, and the English Baptists. Several orphanages, refuges, and schools of special purpose owe their existence to Protestant benevolence.

Education.—In the matter of education the kingdom of Italy at the time of its formation might almost be described as a desert, broken every here and there by an oasis of matchless fertility and luxuriance. The learning of the learned was high, and the ignorance of the ignorant profound. As late as the census of 1861 it was found that in a population of 21,777,331 there were no less than 16,999,701 "analphabetes," or persons absolutely destitute of instruction, absolutely unable to read. Of children between five and twelve as many as 82 per cent. were in this condition; of those between twelve and nineteen 71 per cent. And, as was natural, the ignorance was greater in the female sex than in the male; while 59 per cent. of the men married in 1866 were obliged to make their mark, 78 per cent. of the women were in like case. In certain parts of the country matters were even worse. M. Natoli found, *e.g.*, that in the Basilicata the illiterate class comprised 912 out of every 1,000 inhabitants. It was thus no light task that presented itself to the department of education; and the progress that has been attained does honor to its activity.

The administration of the educational department is not so strictly centralized as it is in France. The minister of public instruction is assisted by a permanent council of fourteen ordinary and seven extraordinary members nominated by the king and chosen from the upper ranks of the educational profession. And this council has no mere nominal existence; it meets regularly thrice a week, though it often contains men of European celebrity. Five of its members, selected by the king, constitute a fine arts commission. Another general council—*the Proveditorato Centrale*—established in 1867, has special control of secondary and primary instruction. In each of the sixty-nine provinces there is a *consiglio scolastico* or school board, under the presidency of the prefect, which has the right of supervision in regard to the sanitary and moral state of the provincial schools, private as well as public. By the law of 1859 (known as the Casati Act) every commune of 4,000 inhabitants is bound to maintain a primary school; but as a matter of fact some of the communes are too small and poor to have a school of their own, and are permitted to send their children to the schools of neighboring communes. Elementary instruction is gratuitous, and by the law of July 15, 1877, the compulsory principle was brought into operation as far as the condition of the communes allows—or, in other words, in all communes of less than 5,000 inhabitants provided with one teacher for every 1,000, in all communes of from 1,000 to 12,000 inhabitants provided with a teacher for every 1,200, and in all the larger communes with one for every 1,500. According to the reports published by the minister of public instruction on the effects of the law, Northern Italy was in the most favorable condition, having a much greater proportion of communes than either Central or Southern Italy. While in the north only 383,916 inhabitants—scattered in little groups through the mountainous districts—were unable to make use of the existing means of instruction, in Central Italy this was found to be the case with 1,230,599 (out of a total population of 6,500,000); and matters were still worse in the south. In the central regions 498 of the 1,235 communes were unable to enforce the law through lack of the legal number of teachers, and in the southern provinces it would have been requisite to increase the teaching staff by 1,536. The principal institutions for secondary education are the gymnasiums and the lyceums. The former have a course of five years, and the instruction comprises Greek, Latin, Italian, history, geography, and arithmetic; the latter, with a three-years course, add to those subjects philosophy, mathematics, physics, chemistry, and natural history. There are seven masters or "professors" in each lyceum. The pupils entering the lyceum are usually from fourteen to fifteen years of age; they are only admitted on presenting a satisfactory gymnasial certificate. According to a pleasant custom, the lyceum usually bears the name of some person of national and at the same time local celebrity—as the Leopardi lyceum at Macerata. As the gymnasiums and lyceums are too exclusively devoted to what is known as classical education satisfactorily to subserve the necessities of modern life, they have been supplemented by a very considerable number of technical schools, the earliest of which in Italy dates as far back as 1848. No fewer than forty-three trade schools were subsidized by the minister of instruction in 1878–79. Most of the secondary educational institutions were intended for boys. In 1861 the municipality of Milan founded a "high school" for girls, and their example has met with very commendable imitation.

For the higher education Italy possesses no fewer than seventeen national universities. They are all of more or less ancient date, except that of Rome, which was opened in 1870, and it is a respect for this antiquity which is in some cases the chief cause of their preservation. Several of them are of comparatively small importance. Besides the seventeen establishments there are four free universities, those of Perugia and Ferrara with three faculties each, and those of Camerino and Urbino with two faculties.

Among the institutions which coöperate with the universities it is sufficient to mention the institute for the higher studies and the school of the social sciences at Florence, the scientific and literary academy of Milan, the upper technical institute of Milan, the engineering schools at Naples, Rome, and Turin, the veterinary colleges at Milan, Naples, and Turin, the royal school of commerce at Venice, the royal school of medicine and surgery at Naples.

The great Italian public libraries are those of Turin, Milan, Naples, Florence. Florence receives a copyright copy of all new books and new editions. The Pavia library is especially rich in works in natural science, the legacy left by Professor Frank enabling it to purchase from 1,500 to 1,600 new works per annum.

Among the philanthropic educational institutions those for the tuition of deafmutes deserve particular attention. It was in Italy that some of the earlier attempts were made to give instruction to this class of unfortunates; and two of its most important establishments, the royal institute of deafmutes at Genoa, and the corresponding institute at Milan, date respectively from 1801 and 1805.

The number of periodicals published in Italy in 1880 was 1454, or about one to every 8,000 of the reading population—a statement that compares favorably with corresponding statistics of other countries. One paper, *Gazzetta Nazionale Genovese*, dates its origin as far back as 1797; all the others belong to the present century, 162 having appeared for the first time in 1876, 227 in 1877, 240 in 1878, and 246 in 1879.

Administration of Justice.—Though, in the opinion of the most competent judges, Italy is still in the main free from that curse of civilized countries, a distinctly differentiated criminal class, there is hardly a country of Europe which presents from year to year such appalling tables of criminality. Leaving out of view the question of brigandage—which was of moment only in the southern provinces, and now extinct, where through long inertness the arm of the law had become comparatively powerless—crimes of violence are exceptionally frequent, and the number of persons undergoing punishment in a given year is in the ratio of 175.51 for every 100,000 inhabitants. In proportion to population there are four times as many persons condemned to death or penal servitude for life as in France, twice as many to hard labor, five times as many to solitary confinement. And it cannot be said that that part of the administration whose duty it is to deal with this multitude of lawbreakers is in a state of competent efficiency. Trial by jury is in force, but there seems good reason to question the fitness of a large part of the population for the exercise of the functions thus devolved upon them.

The Roman court of cassation was instituted only in 1876—the Roman court of appeal having previously been dependent on Florence, and those of Ancona-Macerata, Bologna, and Cagliari on Turin. The number of courts of assize varies from year to year, according to royal decree. The prætors are both civil and criminal judges; in the civil department they can decide in all cases involving less than 1,500 lire.

The "establishments of detention" are of three kinds: —those of preventive detention, or judiciary prisons; those of penal detention, for culprits of full age; and those of correction, or reformatories, for prisoners under age.

Capital punishment was in 1875, after much debate, adopted as the supreme penalty for the whole kingdom (inclusive of Tuscany, where it had not previously been in force); but in November, 1877, the chambers voted by a large majority for the exclusion of the death-penalty from the new code.

Political Administration.—The constitution of the kingdom of Italy is based upon that presented to the Sardinians by King Charles Albert, March 4. 1848. The crown is hereditary in the male line of the house of Savoy. The king—whose majority is attained at the close of his eighteenth year—cannot exercise his legislative functions except in agreement with the voice of the national parliament, and on his accession to the throne he is bound to take an oath in the presence of both chambers that he will obey the constitution. By the law of March 17, 1861, his title is "by God's grace and through the will of the nation king of Italy." His executive functions are exercised by means of responsible ministers, nine in number—(1) the minister of foreign affairs, (2) of the interior, (3) of public instruction, (4) of finance and the treasury, (5) of war, (6) of marine, (7) of grace, justice, and worship, (8) of public works, (9) of agriculture, industry, and commerce. These departments are to all intents the same as those which under slightly different designations existed in the kingdom of Sardinia in 1860, just before the title of king of Italy was assumed by Victor Emmanuel. The ministry of agriculture, however, which was instituted by Cavour in July of that year, was abolished in 1878, but it was restored in 1879.

The Italian parliament consists of two houses or chambers—a senate and a chamber of deputies. The senate consists of the princes of the royal family (who are admitted to the sittings at the age of twenty-one, but cannot vote till they have completed their twenty-fifth year) and an unlimited number of persons, forty years of age or upward, chosen by the king from the ranks of the archbishops and bishops, ministers of the crown and high administrative functionaries, admirals and generals, members of the provincial councils and of the Turin academy, persons who have rendered special services to their country, or who for three years have paid 3,000 lire of direct taxation. Since the removal to Rome the parliament is accommodated in the palace of Monte Citorio. Neither senators nor deputies are paid for their services, but they have the right to a free pass over the whole railway system of the country. All measures must be carried by an absolute majority, or one-half of the members and one.

According to the law of 1860, in force in 1890, there are 508 electoral colleges, the largest of which are the third college of Palermo with 84,767 inhabitants, and the third of Turin with 76,654, and the smallest S. Sepolcro with 30,463, and Benevento with 25,460.

The finances of Italy are not in a satisfactory condition. The nation is enthusiastic and united as to the necessity of having a strong army and navy, but objects to taxation, consequently there is an annual deficit, and the national debt is rapidly accumulating. In 1861 it amounted to £120,000, now its amount is uncertain. A writer in the *Nuova Antologia* estimates it at no less than £872,560,000, and furnishes the following items:

Public Debt, 1890.. (1900, £505,811,570) ..	£520,000,000
Provincial Debt	6,880,000
Communal Debt	35,320,000
Private Interest-bearing Mortgages	310,360,000
Total	£872,560,000

Involving a yearly payment of interest of £38,000,000.

HISTORY.

The difficulty of Italian history lies in this, that until our own time the Italians have had no political unity, no independence, no organized existence as a nation. Split up into numerous and mutually hostile communities, they never, through the fourteen centuries which have elapsed since the end of the old Western empire, shook off the yoke of foreigners completely; they never until lately learned to merge their local and conflicting interests in the common good of undivided Italy. Their history is therefore not the history of a single people, centralizing and absorbing its constituent elements by a process of continued evolution, but of a group of cognate populations, exemplifying divers types of constitutional development.

Without attaching undue importance to the date 476 as marking the boundary between ancient and modern history, there is no doubt that this year opened a new age for the Italian people. Odovakar, a chief of the Herulians, deposed Romulus, the last Augustus of the West, and placed the peninsula beneath the titular sway of the Byzantine emperors. At Pavia the barbarian conquerors of Italy proclaimed him king, and he received from Zeno the dignity of Roman patrician. Thus began that system of mixed government, Teutonic and Roman, which, in the absence of a national monarch, impressed the institutions of new Italy from the earliest date with dualism. The same revolution vested supreme authority in a non-resident and inefficient autocrat, whose title gave him the right to interfere in Italian affairs, but who lacked the power and will to rule the people for his own or their advantage. Odovakar inaugurated that long series of foreign rulers—Greeks, Franks, Germans, Spaniards, and Austrians—who have successively contributed to the misgovernment of Italy from distant seats of empire.

Gothic and Lombard Kingdoms.

In 488 Theodoric, king of the East Goths, received commission from the Greek emperor, Zeno, to undertake the affairs of Italy. He defeated Odovakar, drove him to Ravenna, besieged him there, and in 493 completed the conquest of the country by murdering the Herulian chief with his own hand. Theodoric respected the Roman institutions which he found in Italy, held the Eternal City sacred, and governed by ministers chosen from the Roman population. He settled at Ravenna, which had been the capital of Italy since the days of Honorius, and which still testifies by its monuments to the Gothic chieftain's Romanizing policy. Those who believe that the Italians would have gained strength by unification in a single monarchy must regret that this Gothic kingdom lacked the elements of stability. The Goths, except in the valley of the Po, resembled an army of occupation rather than a people numerous enough to blend with the Italian stock. Though their rule was favorable to the Romans, they were Arians; and religious differences, combined with the pride and jealousies of a nation accustomed to imperial honors, rendered the inhabitants of Italy eager to throw off their yoke. When, therefore, Justinian undertook the reconquest of Italy, his generals, Belisarius and Narses, were supported by the south. The struggle of the Greeks and the Goths was carried on for fourteen years, between 539 and 553, when Teia, the last Gothic king, was finally defeated in a bloody battle near Vesuvius. At its close the provinces of Italy were placed beneath Greek dukes, controlled by a governor-general, entitled exarch, who ruled in the Byzantine emperor's name at Ravenna.

This new settlement lasted but a few years. Narses had employed Lombard auxiliaries in his campaigns against the Goths; and when he was recalled by an insulting message from the empress in 565, he is said to have invited this fiercest and rudest of the Teutonic clans to seize the spoils of Italy. Be this as it may, the Lombards, their ranks swelled by the Gepidæ, whom they had lately conquered, and by the wrecks of other barbarian tribes, passed southward under their king Alboin in 568. The Herulian invaders had been but a band of adventurers; the Goths were an army; the Lombards, far more formidable, were a nation in movement. Pavia offered stubborn resistance; but after a three-years siege it was taken, and Alboin made it the capital of his new kingdom.

In order to understand the future history of Italy, it is necessary to form a clear conception of the method pursued by the Lombards in their conquest. Penetrating the peninsula, and advancing like a glacier or half-liquid stream of mud, they occupied the valley of the Po, and moved slowly downward through the center of the country. Numerous as they were compared with their Gothic predecessors, they had not strength or multitude enough to occupy the whole peninsula. Venice, which, since the days of Attila, had offered an asylum to Roman refugees from the northern cities, was left untouched. So was Genoa with its Riviera. Ravenna, intrenched within her lagoons, remained a Greek city. Rome, protected by invincible prestige, escaped. The seacoast cities of the south, and the islands, Sicily, Sardinia, and Corsica, preserved their independence. Thus the Lombards neither occupied the extremities nor subjugated the brain-center of the country. The strength of Alboin's kingdom was in the north; his capital, Pavia. As his people pressed southward, they omitted to possess themselves of the coasts; and, what was worse for the future of these conquerors, the original impetus of the invasion was checked by the untimely murder of Alboin in 573. After this event, the semi-independent chiefs of the Lombard tribe, who borrowed the title of dukes from their Roman predecessors, seem to have been contented with consolidating their power in the districts each had occupied. The duchies of Spoleto in the center, and of Benevento in the south, inserted wedgelike into the middle of the peninsula, and inclosing independent Rome, were but loosely united to the kingdom at Pavia. Italy was broken up into districts, each offering points for attack from without, and fostering the seeds of internal revolution. Three separate capitals must be discriminated—Pavia, the seat of the new Lombard kingdom; Ravenna, the garrison city of the Byzantine emperor; and Rome, the rallying point of the old nation, where the successor of St. Peter was already beginning to assume that national protectorate which proved so influential in the future.

The rule of the Lombards proved at first far more oppressive to the native population, and was less tolerant of their old customs, than that of the Goths had been. Wherever the Lombards had the upper hand, they placed the country under military rule, resembling in its general character what we now know as the feudal system. Though there is reason to suppose that the Roman laws were still administered within the cities, yet the Lombard code was that of the kingdom; and the Lombards being Arians, they added the oppression of religious intolerance to that of martial despotism and barbarous cupidity. The Italians were reduced to the last extremity when Gregory the Great (590–604), having strengthened his position by diplomatic relations with the duchy of Spoleto, and brought about the conversion of the Lombards to orthodoxy, raised the cause of the remaining Roman population throughout Italy. The fruit of his policy, which made of Rome a counterpoise against the effete empire of the Greeks upon the one hand and against the pressure of the feudal kingdom on the other, was seen in the succeeding century. When Leo the Isaurian published his decrees against the worship of images in 726, Gregory II. allied himself with Liudprand, the Lombard king, threw off allegiance to Byzantium. and established the autonomy of Rome. This pope initiated the dangerous policy of playing one hostile force off against another with a view to securing independence. He used the Lombards in his struggle with the Greeks, leaving to his successors the duty of checking these unnatural allies. This was accomplished by calling the Franks in against the Lombards. Liudprand pressed hard, not only upon the Greek dominions of the exarchate, but also upon Rome. His successors, Rachis and Astolf, attempted to follow the same game of conquest. But the popes, Gregory III., Zachary and Stephen II., determining at any cost to espouse the national cause and to aggrandize their own office, continued to rely upon the Franks. Pippin twice crossed the Alps, and forced Astolf to relinquish his acquisitions, including Ravenna, Pentapolis, the coast towns of Romagna, and some cities in the duchy of Spoleto. These he handed over to the pope of Rome. This donation of Pippin in 756 confirmed the papal see in the protectorate of the Italic party, and conferred upon it sovereign rights. The virtual outcome of the contest carried on by Rome since the year 726 with Byzantium and Pavia was to place the popes in the position held by the Greek exarch, and to confirm the limitation of the Lombard kingdom. We must, however, be cautious to remember that the south of Italy was comparatively unaffected. The dukes of the Greek empire and the Lombard dukes of Benevento, together with a few autonomous commercial cities, still divided Italy below the Campagna of Rome.

Frankish Emperors.

The Franko-Papal alliance, which conferred a crown on Pippin and sovereign rights upon the see of Rome, held within itself that ideal of mutually supporting papacy and empire which exercised so powerful an influence in mediæval history. When Charles the Great (Charlemagne) deposed his father-in-law Desiderius, the last Lombard king, in 774, and when he received the circlet of the empire from Leo III. at Rome in 800, he did but complete and ratify the compact offered to his grandfather, Charles Martel, by Gregory III. The relations between the new emperor and the pope were ill defined; and this proved the source of infinite disasters to Italy and Europe in the sequel. But for the moment each seemed necessary to the other; and that sufficed. Charles took possession of the kingdom of Italy, as limited by Pippin's settlement. The pope was confirmed in his rectorship of the cities ceded by Astolf, with the further understanding, tacit rather than expressed, that, even as he had wrung these provinces for the Italic people from both Greeks and Lombards, so in the future he might claim the protectorate of such portions of Italy, external to the kingdom, as he should be able to acquire. This, at any rate, seems to be the meaning of that obscure re-settlement of the peninsula which Charles effected. The kingdom of Italy, transmitted on his death by Charles the Great, and afterward confirmed to his grandson Lothar by the peace of Verdun in 843, stretched from the Alps to Terracina. The duchy of Benevento remained tributary, but independent. The cities of Gaeta and Naples, Sicily, and the so-called Theme of Lombardy in South Apulia and Calabria, still recognized the Byzantine emperor. Venice stood aloof, professing a nominal allegiance to the East. The parcels into which the Lombards had divided the peninsula remained thus virtually unaltered, except for the new authority acquired by the see of Rome.

Internally Charles left the affairs of the Italian kingdom much as he found them, except that he appears to have pursued the policy of breaking up the larger fiefs of the Lombards, substituting counts for their dukes, and adding to the privileges of the bishops. We may reckon these measures among the earliest advantages extended to the cities, which still contained the bulk of the old Roman population, and which were destined to intervene with decisive effect two centuries later in Italian history. It should also here be noticed that the changes introduced into the holding of the fiefs, whether by altering their boundaries or substituting Frankish for Lombard vassals, were chief among the causes why the feudal system took no permanent hold in Italy. Feudalism was not at any time a national institution. The hierarchy of dukes and marquises and counts consisted of foreign soldiers imposed on the indigenous inhabitants; and the rapid succession of conquerors, Lombards, Franks, and Germans, following each other at no long interval, and each endeavoring to weaken the remaining strength of his predecessor, prevented this alien hierarchy from acquiring fixity by permanence of tenure. Among the many miseries inflicted upon Italy by the frequent changes of her northern rulers, this at least may be reckoned a blessing.

The Italians acknowledged eight kings of the house of Charles the Great, ending in Charles the Fat, who was deposed in 888. After them followed ten sovereigns, some of whom have been misnamed Italians by writers too eager to catch at any resemblance of national glory for a people passive in the hands of foreign masters. The truth is that no period in Italian history was less really glorious than that which came to a close in 961 by Berengar II.'s cession of his rights to Otto the Great. It was a period marked in the first place by the conquest of the Saracens, who began to occupy Sicily early in the ninth century, overran Calabria and Apulia, took Bari, and threatened Rome. In the second place it was marked by a restoration of the Greeks to power. In 890 they established themselves again at Bari, and ruled the Theme of Lombardy by means of an officer entitled Catapan. In the third place it was marked by a decline of good government in Rome. Early in the tenth century the papacy fell into the hands of a noble family, known eventually as the counts of Tusculum, who almost succeeded in rendering the office hereditary, and in uniting the civil and ecclesiastical functions of the city under a single member of their house. It is not necessary to relate the scandals of Marozia's and Theodora's female reign, the infamies of John XII., or the intrigues which tended to convert Rome into a duchy. The most important fact for the historian of Italy to notice is that during this time the popes abandoned, not only their high duties as chiefs of Christendom, but also their protectorate of Italian liberties. A fourth humiliating episode in this period was the invasion of the Magyar barbarians, who overran the north of Italy, and reduced its fairest provinces to the condition of a wilderness. Anarchy and misery are indeed the main features of that long space of time which elapsed between the death of Charles the Great and the descent of Otto. Through the almost impenetrable darkness and confusion we only discern this much, that Italy was powerless to constitute herself a nation.

The discords which followed on the break-up of the Carolingian power, and the weakness of the so-called Italian emperors, who were unable to control the feudatories (marquises of Ivrea and Tuscany, dukes of Friuli and Spoleto), from whose ranks they sprang, exposed Italy to ever-increasing misrule. The country by this time had become thickly covered over with castles, the seats of greater or lesser nobles, all of whom were eager to detach themselves from strict allegiance to the "Regno." The cities, exposed to pillage by Huns in the north and Saracens in the south, and ravaged on the coast by Norse pirates, asserted their right to inclose themselves with walls, and taught their burghers the use of arms. Within the circuit of their ramparts, the bishops already began to exercise authority in rivalry with the counts, to whom, since the days of Theodoric, had been intrusted the government of the Italian burghs. Agreeably to feudal customs, these nobles, as they grew in power, retired from the town, and built themselves fortresses on points of vantage in the neighborhood. Thus the titular king of Italy found himself simultaneously at war with those great vassals who had chosen him from their own class, with the turbulent factions of the Roman aristocracy, with unruly bishops in the growing cities, and with the multitude of minor counts and barons who occupied the open lands, and who changed sides according to the interests of the moment. The last king of the quasi-Italian succession, Berengar II., marquis of Ivrea (951–961), made a vigorous effort to restore the authority of the regno; and had he succeeded, it is not impossible that now, at the last moment, Italy might have become an independent nation. But this attempt at unification was reckoned to Berengar for a crime. He only won the hatred of all classes, and was represented by the obscure annalists of that period as an oppressor of the church and a remorseless tyrant. In Italy, divided between feudal nobles and almost hereditary ecclesiastics, of foreign blood and alien sympathies, there was no national feeling. Berengar stood alone against a multitude, unanimous in their intolerance of discipline. His predecessor in the kingdom, Lothar, had left a young and beautiful widow, Adelheid. Berengar imprisoned her upon the Lake of Como, and threatened her with a forced marriage to his son Adalbert. She escaped to the castle of Canossa, where the great count of Tuscany espoused her cause, and appealed in her behalf to Otto the Saxon. The king of Germany descended into Italy, and took Adelheid in marriage. After this episode Berengar was more discredited and impotent than ever. In the extremity of his fortunes he had recourse himself to Otto, making a formal cession of the Italian kingdom, in his own name and that of his son Adalbert, to the Saxon as his overlord. By this slender tie the crown of Italy was joined to that of Germany; and the formal right of the elected king of Germany to be considered king of Italy and emperor may be held to have accrued from this epoch.

The German Emperors.

Berengar gained nothing by his act of obedience to Otto. The great Italian nobles, in their turn, appealed to Germany. Otto entered Lombardy in 961, deposed Berengar, assumed the crown in St. Ambrogio at Milan, and in 962 was proclaimed emperor by John XII. at Rome. Henceforward Italy changed masters according as one or other of the German families assumed supremacy beyond the Alps. It is one of the strongest instances furnished by history of the fascination exercised by an idea that the Italians themselves should have grown to glory in this dependence of their nation upon Cæsars who had nothing but a name in common with the Roman Imperator of the past.

The first thing we have to notice in this revolution which placed Otto the Great upon the imperial throne is that the Italian kingdom, founded by the Lombards, recognized by the Franks, and recently claimed by eminent Italian feudatories, virtually ceased to exist. It was merged in the German kingdom; and, since for the German princes Germany was of necessity their first care, Italy from this time forward began to be left more and more to herself. The central authority of Pavia had always been weak; the regno had proved insufficient to combine the nation. But now even that shadow of union disappeared, and the Italians were abandoned to the slowly working influences which tended to divide them into separate states. The most brilliant period of their checkered history, the period which includes the rise of communes, the exchange of municipal liberty for despotism, and the gradual discrimination of the five great powers (Milan, Venice, Florence, the Papacy, and the kingdom of Naples), now begins. Among the centrifugal forces which determined the future of the Italian race must be reckoned, first and foremost, the new spirit of municipal independence. We have seen how the cities inclosed themselves with walls, and how the bishops defined their authority against that of the counts. Otto encouraged this revolution by placing the inclosures of the chief burghs beyond the jurisdiction of the counts. Within those precincts the bishops and the citizens were independent of all feudal masters but the emperor. He further broke the power of the great vassals by redivisions of their feuds, and by the creation of new marches which he assigned to his German followers. In this way, owing to the dislocation of the ancient aristocracy, to the enlarged jurisdiction of a power so democratic as the episcopate, and to the increased privileges of the burghs, feudalism received a powerful check in Italy. The Italian people, that people which gave to the world the commerce and the arts of Florence, was not indeed as yet apparent. But the conditions under which it could arise, casting from itself all foreign and feudal trammels, recognizing its true past in ancient Rome, and reconstructing a civility out of the ruins of those glorious memories, were now at last granted. The nobles from this time forward retired into the country and the mountains, fortified themselves in strong places outside the cities, and gave their best attention to fostering the rural population. Within the cities and upon the open lands the Italians, in this and the next century, doubled, trebled, and quadrupled their numbers. A race was formed strong enough to keep the empire itself in check, strong enough, except for its own internecine contests, to have formed a nation equal to its happier neighbors.

The recent scandals of the papacy induced Otto to deprive the Romans of their right to elect popes. But when he died, in 973, his son Otto II. (married to Theophano of the imperial Byzantine house) and his grandson, Otto III., who descended into Italy in 996, found that the affairs of Rome and of the southern provinces were more than even their imperial powers could cope with. The faction of the counts of Tusculum raised its head from time to time in the Eternal City, and Rome still claimed to be a commonwealth. Otto III.'s untimely death in 1002 introduced new discords. Rome fell once more into the hands of her nobles. The Lombards chose Ardoin, marquis of Ivrea, for king, and Pavia supported his claims against those of Henry of Bavaria, who had been elected in Germany. Milan sided with Henry; and this is perhaps the first eminent instance of cities being reckoned powerful allies in the Italian disputes of sovereigns. It is also the first instance of that bitter feud between the two great capitals of Lombardy, a feud rooted in ancient antipathies between the Roman population of Mediolanum and the Lombard garrison of Alboin's successors, which proved so disastrous to the national cause. Ardoin retired to a monastery, where he died in 1015. Henry nearly destroyed Pavia, was crowned in Rome, and died in 1024. After this event, Heribert, the archbishop of Milan, invited Conrad, the Franconian king of Germany, into Italy, and crowned him with the iron crown of the kingdom.

The intervention of this man, Heribert, compels us to turn a closer glance upon the cities of North Italy. It is here, at the present epoch and for the next two centuries, that the pith and nerve of the Italian nation must be sought; and among the burghs of Lombardy, Milan, the eldest daughter of ancient Rome, assumes the lead. In Milan we hear for the first time the word *Comune.* In Milan the citizens first form themselves into a *Parlamento.* In Milan the archbishop organizes the hitherto voiceless, defenseless population into a community capable of expressing its needs, and an army ready to maintain its rights. To Heribert is attributed the invention of the *Carroccio*, which played so singular and important a part in the warfare of Italian cities. A huge car drawn by oxen, bearing the standard of the burgh, and carrying an altar with the host, this carroccio, like the ark of the Israelites, formed a rallying point in battle, and reminded the armed artisans that they had a city and a church to fight for. That Heribert's device proved effectual in raising the spirit of his burghers, and consolidating them into a formidable band of warriors, is shown by the fact that it was speedily adopted in all the free cities. It must not, however, be supposed that at this epoch the liberties of the burghs were fully developed. The mass of the people remained unrepresented in the government; and even if the consuls existed in the days of Heribert, they were but humble legal officers, transacting business for their constituents in the courts of the bishop and his viscount. It still needed nearly a century of struggle to render the burghers independent of lordship, with a fully organized commune, self-governed in its several assemblies. While making these reservations, it is at the same time right to observe that certain Italian communities were more advanced upon the path of independence than others. This is specially the case with the maritime ports. Not to mention Venice, which has not yet entered the Italian community, and remains a Greek free city, Genoa and Pisa were rapidly rising into ill-defined autonomy. Their command of fleets gave them incontestable advantages, as when, for instance, Otto II. employed the Pisans in 980 against the Greeks in Lower Italy, and the Pisans and Genoese together attacked the Saracens of Sardinia in 1017. Still, speaking generally, the age of independence for the burghs had only begun when Heribert from Milan undertook the earliest organization of a force that was to become paramount in peace and war.

Next to Milan, and from the point of view of general politics even more than Milan, Rome now claims attention. The destinies of Italy depended upon the character which the see of St. Peter should assume. Even the liberties of her republics in the north hung on the issue of a contest which in the eleventh and twelfth centuries shook Europe to its farthest boundaries. So fatally were the internal affairs of that magnificent but unhappy country bound up with concerns which brought the forces of the civilized world into play. Her ancient prestige, her geographical position, and the intellectual primacy of her most noble children rendered Italy the battleground of principles that set all Christendom in motion, and by the clash of which she found herself forever afterward divided. During the reign of Conrad II., the party of the counts of Tusculum revived in Rome; and Crescentius, claiming the title of consul in the imperial city, sought once more to control the election of the popes. When Henry III., the son of Conrad, entered Italy in 1046, he found three popes in Rome. These he abolished, and, taking the appointment into his own hands, gave German bishops to the see. The policy thus initiated upon the precedent laid down by Otto the Great was a remedy for pressing evils. It saved Rome from becoming a duchy in the hands of the Tusculan house. But it neither raised the prestige of the papacy, nor could it satisfy the Italians, who rightly regarded the Roman see as theirs. These German popes were short-lived and inefficient. Their appointment, according to notions which defined themselves within the church at this epoch, was simoniacal; and during the long minority of Henry IV., who succeeded his father in 1056, the terrible Tuscan monk, Hildebrand of Soana, forged weapons which he used with deadly effect against the presumption of the empire. The condition of the church seemed desperate, unless it could be purged of crying scandals—of the subjection of the papacy to the great Roman nobles, of its subordination to the German emperor, and of its internal demoralization. It was Hildebrand's policy throughout three papacies, during which he controlled the counsels of the Vatican, and before he himself assumed the tiara, to prepare the mind of Italy and Europe for a mighty change. His programme included these three points:—(1) the celibacy of the clergy; (2) the abolition of ecclesiastical appointments made by the secular authority; (3) the vesting of the papal election in the hands of the Roman clergy and people, presided over by the curia of cardinals. How Hildebrand paved the way for these reforms during the pontificates of Nicholas II. and Alexander II., how he succeeded in raising the papal office from the depths of degradation and subjection to illimitable sway over the minds of men in Europe, and how his warfare with the empire established on a solid basis the still doubtful independence of the Italian burghs, renewing the long neglected protectorate of the Italian race, and bequeathing to his successors a national policy which had been forgotten by the popes since his great predecessor Gregory II., forms a chapter in European history which must now be interrupted. We have to follow the fortunes of unexpected allies, upon whom in no small measure his success depended.

In order to maintain some thread of continuity through the perplexed and tangled vicissitudes of the Italian race, it has been necessary to disregard those provinces which did not immediately contribute to the formation of its history. For this reason we have left the whole of the south up to the present point unnoticed. Sicily in the hands of the Mussulmans, the Theme of Lombardy abandoned to the weak suzerainty of the Greek catapans, the Lombard duchy of Benevento slowly falling to pieces, and the maritime republics of Naples, Gaeta, and Amalfi extending their influence by commerce in the Mediterranean, were in effect detached from the Italian regno, beyond the jurisdiction of Rome, included in no parcel of Italy proper. But now the moment had arrived when this vast group of provinces, forming the future kingdom of the two Sicilies, was about to enter definitely and decisively within the bounds of the Italian community. Some Norman adventurers on pilgrimage to St. Michael's shrine on Monte Gargano, lent their swords in 1017 to the Lombard cities of Apulia against the Greeks. Twelve years later we find the Normans settled at Aversa under their Count Rainulf. From this station as a center the little band of adventurers, playing the Greeks off against the Lombards, and the Lombards against the Greeks, spread their power in all directions, until they made themselves the most considerable force in southern Italy. William of Hauteville was proclaimed count of Apulia. His half-brother, Robert Wiskard or Guiscard, after defeating the papal troops at Civitella in 1053, received from Leo IX. the investiture of all present and future conquests in Apulia, Calabria, and Sicily, which he agreed to hold as fiefs of the Holy Sea. Nicholas II. ratified this grant, and confirmed the title of count. Having consolidated their possessions on the mainland, the Normans, under Robert Guiscard's brother, the great Count Roger, undertook the conquest of Sicily in 1060. After a prolonged struggle of thirty years, they wrested the whole island from the Saracens; and Roger, dying in 1101, bequeathed to his son Roger a kingdom in Calabria and Sicily second to none in Europe for wealth and magnificence. This, while the elder branch of the Hauteville still held the title and domains of the Apulian duchy; but in 1127, upon the death of his cousin Duke William, Roger united the whole of the future realm. In 1130 he assumed the style of king of Sicily.

This Norman conquest of the two Sicilies forms the most romantic episode in mediæval Italian history. By the consolidation of Apulia, Calabria, and Sicily into a powerful kingdom, by checking the growth of the maritime republics, and by recognizing the over-lordship of the papal see, the house of Hauteville influenced the destinies of Italy with more effect than any of the princes who had previously dealt with any portion of the peninsula. Their kingdom, though Naples was from time to time separated from Sicily, never quite lost the cohesion they had given it; and all the disturbances of equilibrium in Italy were due in after days to papal manipulation of the rights acquired by Robert Guiscard's act of homage. The southern regno, in the hands of the popes, proved an insurmountable obstacle to the unification of Italy, led to French interference in Italian affairs, introduced the Spaniard, and maintained in those rich southern provinces the reality of feudal sovereignty long after this alien element had been eliminated from the rest of Italy.

For the sake of clearness, we have anticipated the course of events by nearly a century. We must now return to the date of Hildebrand's elevation to the papacy in 1073, when he chose the memorable name of Gregory VII. In the next year after his election Hildebrand convened a council, and passed measures enforcing the celibacy of the clergy. In 1075 he caused the investiture of ecclesiastical dignitaries by secular potentates of any degree to be condemned. These two reforms, striking at the most cherished privileges and most deeply-rooted self-indulgences of the aristocratic caste in Europe, inflamed the bitterest hostility. Henry IV., king of Germany, but not crowned emperor, convened a diet in the following year at Worms, where Gregory was deposed and excommunicated. The pope followed with a counter excommunication, far more formidable, releasing the king's subjects from their oaths of allegiance. War was thus declared between the two chiefs of Western Christendom, that war of investitures which outlasted the lives of both Gregory and Henry, and was not terminated till the year 1122. The dramatic episodes of this struggle are too well known to be enlarged upon. In his single-handed duel with the strength of Germany, Gregory received material assistance from the Countess Matilda of Tuscany. She was the last heiress of the great house of Canossa, whose fiefs stretched from Mantua across Lombardy, passed the Apennines, included the Tuscan plains, and embraced a portion of the duchy of Spoleto. It was in her castle of Canossa that Henry IV. performed his three days' penance in the winter of 1077; and there she made the cession of her vast domains to the church. That cession, renewed after the death of Gregory to his successors, conferred upon the popes indefinite rights, of which they afterward availed themselves in the consolidation of their temporal power. Matilda died in the year 1115. Gregory had passed before her from the scene of his contest, an exile at Salerno, whither Robert Wiskard carried him in 1084 from the anarchy of rebellious Rome. With unbroken spirit, though the objects of his life were unattained, though Italy and Europe had been thrown into confusion, and the issue of the conflict was still doubtful, Gregory expired in 1085 with these words on his lips: "I loved justice, I hated iniquity, therefore in banishment I die."

The greatest of the popes thus breathed his last; but the new spirit he had communicated to the papacy was not destined to expire with him. Gregory's immediate successors, Victor III., Urban II., and Paschal II., carried on his struggle with Henry IV. and his imperial anti-popes, encouraging the emperor's son to rebel against him, and stirring up Europe for the first crusade. When Henry IV. died, his own son's prisoner, in 1106, Henry V. crossed the Alps, entered Rome, wrung the imperial coronation from Paschal II., and compelled the pope to grant his claims on the investitures. Scarcely had he returned to Germany when the Lateran disavowed all that the pope had done, on the score that it had been extorted by force. France sided with the church. Germany rejected the bull of investiture. A new descent into Italy, a new seizure of Rome, proved of no avail. The emperor's real weakness was in Germany, where his subjects openly expressed their discontent. He at last abandoned the contest which had distracted Europe. By the concordat of Worms, 1122, the emperor surrendered the right of investiture by ring and staff, and granted the right of election to the clergy. The popes were henceforth to be chosen by the cardinals, the bishops by the chapters subject to the pope's approval. On the other hand the pope ceded to the emperor the right of investiture by the scepter. But the main issue of the struggle was not in these details of ecclesiastical government; principles had been at stake far deeper and more widely reaching. The respective relations of pope and emperor, ill-defined in the compact between Charles the Great and Leo III., were brought in question, and the two chief potentates of Christendom, no longer tacitly concordant, stood against each other in irreconcilable rivalry. Upon this point, though the battle seemed to be a drawn one, the popes were really the victors. They remained independent of the emperor, but the emperor had still to seek the crown at their hands. The pretensions of Otto the Great and Henry III. to make popes were gone forever.

Age of the Communes.

The final gainers, however, by the war of investitures were the Italians. In the first place, from this time forward, owing to the election of popes by the Roman curia, the Holy See remained in the hands of Italians; and this, though it was by no means an unmixed good, was a great glory to the nation. In the next place the antagonism of the popes to the emperors, which became hereditary in the Holy College, forced the former to assume the protectorate of the national cause. But by far the greatest profit the Italians reaped was the emancipation of their burghs. During the forty-seven years' war, when pope and emperor were respectively bidding for their alliance, and offering concessions to secure their support, the communes grew in self-reliance, strength, and liberty. As the bishops had helped to free them from subservience to their feudal masters, so the war of investitures relieved them of dependence on their bishops. The age of real autonomy, signalized by the supremacy of consuls in the cities, had arrived.

In the republics, as we begin to know them after the war of investitures, government was carried on by officers called consuls, varying in number according to custom and according to the division of the town into districts. These magistrates, as we have already seen, were originally appointed to control and protect the humbler classes. But, in proportion as the people gained more power in the field the consuls rose in importance, superseded the bishops, and began to represent the city in transactions with its neighbors. Popes and emperors, who needed the assistance of a city, had to seek it from the consuls, and thus these officers gradually converted an obscure and indefinite authority into what resembles the presidency of a commonwealth. They were supported by a deliberative assembly, called *credenza*, chosen from the more distinguished citizens. In addition to this privy council, we find a *gran consiglio*, consisting of the burghers who had established the right to interfere immediately in public affairs, and a still larger assembly called *parlamento*, which included the whole adult population. Though the institutions of the communes varied in different localities, this is the type to which they all approximated. It will be perceived that the type was rather oligarchial than strictly democratic. Between the parlamento and the consuls with their privy council, or credenza, was interposed the gran consiglio of privileged burghers. These formed the aristocracy of the town, who by their wealth and birth held its affairs within their custody. There is good reason to believe that, when the term *popolo* occurs, it refers to this body, and not to the whole mass of the population. The *comune* included the entire city—bishop, consuls, oligarchy, councils, handicraftsmen, proletariate. The *popolo* was the governing or upper class. It was almost inevitable in the transition from feudalism to democracy that this intermediate ground should be traversed; and the peculiar Italian phrases, *primo popolo*, *secondo popolo*, *terzo popolo*, and so forth, indicate successive changes, whereby the oligarchy passed from one stage to another in its progress toward absorption in democracy or tyranny.

Under their consuls the Italian burghs rose to a great height of prosperity and splendor. Pisa built her Duomo. Milan undertook the irrigation works which enriched the soil of Lombardy forever. Massive walls, substantial edifices, commodious seaports, good roads, were the benefits conferred by this new government on Italy. It is also to be noted that the people now began to be conscious of their past. They recognized the fact that their blood was Latin as distinguished from Teutonic, and that they must look to ancient Rome for those memories which constitute a people's nationality. At this epoch the study of Roman law received a new impulse, and this is the real meaning of the legend that Pisa, glorious through her consuls, brought the pandects in a single codex from Amalfi. The very name consul, no less than the Romanizing character of the best architecture of the time, points to the same revival of antiquity.

The rise of the Lombard communes produced a sympathetic revolution in Rome, which deserves to be mentioned in this place. A monk, named Arnold of Brescia, animated with the spirit of the Milanese, stirred up the Romans to shake off the temporal sway of their bishop. He attempted, in fact, upon a grand scale what was being slowly and quietly effected in the northern cities. Rome, ever mindful of her antique past, listened to Arnold's preaching. A senate was established, and the republic was proclaimed. The title of patrician was revived, and offered to Conrad, king of Italy, but not crowned emperor. Conrad refused it, and the Romans conferred it upon one of their own nobles. Though these institutions borrowed high-sounding titles from antiquity, they were in reality imitations of the Lombard civic system. The patrician stood for the consuls. The senate, composed of nobles, represented the credenza and the gran consiglio. The pope was unable to check this revolution, which is now chiefly interesting as further proof of the insurgence of the Latin as against the feudal elements in Italy at this period.

Though the communes gained so much by the war of investitures, the division of the country between the pope's and emperor's parties was no small price to pay for independence. It inflicted upon Italy the ineradicable curse of party warfare, setting city against city, house against house, and rendering concordant action for a national end impossible. No sooner had the compromise of the investitures been concluded than it was manifest that the burghers of the now enfranchised communes were resolved to turn their arms against each other. We seek in vain an obvious motive for each separate quarrel. All we know for certain is that, at this epoch, Rome attempts to ruin Tivoli, and Venice Pisa; Milan fights with Cremona, Cremona with Crema, Pavia with Verona, Verona with Padua, Piacenza with Parma, Modena and Reggio with Bologna, Bologna and Faenza with Ravenna and Imola, Florence and Pisa with Lucca and Siena, and so on through the whole list of cities. The nearer the neighbors, the more rancorous and internecine is the strife; and, as in all cases where animosity is deadly and no grave local causes of dispute are apparent, we are bound to conclude that some deeply-seated permanent uneasiness goaded these fast growing communities into rivalry. Italy was, in fact, too small for her children. As the towns expanded, they perceived that they must mutually exclude each other. They fought for bare existence, for primacy in commerce, for the command of seaports, for the keys of mountain passes, for rivers, roads, and all the avenues of wealth and plenty. The pope's cause and the emperor's cause were of comparatively little moment to Italian burghers; and the names of Guelf and Ghibelline, which before long began to be heard in every street, on every market-place, had no meaning for them. These watchwords are said to have arisen in Germany during the disputed succession of the empire between 1135 and 1152, when the Welfs of Bavaria opposed the Swabian princes of Waiblingen origin. But in Italy, although they were severally identified with the papal and imperial parties, they really served as symbols for jealousies which altered in complexion from time to time and place to place, expressing more than antagonistic political principles, and involving differences vital enough to split the social fabric to its foundation.

Under the imperial rule of Lothar the Saxon (1125–1137) and Conrad the Swabian (1138–1152), these civil wars increased in violence owing to the absence of authority. Neither Lothar nor Conrad was strong at home; the former had no influence in Italy, and the latter never entered Italy at all. But when Conrad died, the electors chose his nephew Frederick, surnamed Barbarossa, who united the rival honors of Welf and Waiblingen, to succeed him; and it was soon obvious that the empire had a master powerful of brain and firm of will. Frederick immediately determined to reassert the imperial rights in his southern provinces, and to check the warfare of the burghs. When he first crossed the Alps in 1154, Lombardy was, roughly speaking, divided between two parties, the one headed by Pavia professing loyalty to the empire, and the other headed by Milan ready to oppose its claims. The municipal animosities of the last quarter of a century gave substance to these factions; yet neither the imperial nor the anti-imperial party had any real community of interest with Frederick. He came to supersede self-government by consuls, to deprive the cities of the privilege of making war on their own account, and to extort his regalian rights of forage, food, and lodging for his armies. It was only the habit of interurban jealousy which prevented the communes from at once combining to resist demands which threatened their liberty of action, and would leave them passive at the pleasure of a foreign master. The diet was opened at Roncaglia near Piacenza, where Frederick listened to the complaints of Como and Lodi against Milan, of Pavia against Tortona, and of the marquis of Montferrat against Asti and Chieri. The plaintiffs in each case were imperialists; and Frederick's first action was to redress their supposed grievances. He laid waste Chieri, Asti, and Tortona, then took the Lombard crown at Pavia, and, reserving Milan for a future day, passed southward to Rome. Outside the gates of Rome he was met by a deputation from the senate he had come to supersede, who addressed him in words memorable for expressing the republican spirit of new Italy face to face with autocratic feudalism: "Thou wast a stranger, I have made thee a citizen;" it is Rome who speaks: "Thou camest as an alien from beyond the Alps, I have conferred on thee the principality." Moved only to scorn and indignation by the rhetoric of these presumptuous enthusiasts, Frederick marched into the Leonine city, and took the imperial crown from the hands of Hadrian IV. In return for this compliance, the emperor delivered over to the pope his troublesome rival Arnold of Brescia, who was burned alive by Nicholas Breakspear, the only English successor of St. Peter. The gates of Rome itself were shut against Frederick; and even on this first occasion his good understanding with Hadrian began to suffer. The points of dispute between them related mainly to Matilda's bequest, and to the kingdom of Sicily, which the pope had rendered independent of the empire by renewing its investiture in the name of the Holy See. In truth, the papacy and the empire had become irreconcilable. Each claimed illimitable authority, and neither was content to abide within such limits as would have secured a mutual tolerance. Having obtained his coronation, Frederick withdrew to Germany, while Milan prepared herself against the storm which threatened. In the ensuing struggle with the empire, that great city rose to the altitude of patriotic heroism. By their sufferings no less than by their deeds of daring, her citizens showed themselves to be sublime, devoted, and disinterested, winning the purest laurels which give luster to Italian story. Almost within Frederick's presence, they rebuilt Tortona, punished Pavia, Lodi, Cremona, and the marquis of Montferrat. Then they fortified the Adda and Ticinio, and waited for the emperor's next descent. He came in 1158 with a large army, overran Lombardy, raised his imperial allies, and sat down before the walls of Milan. Famine forced the burghers to partial obedience, and Frederick held a victorious diet at Roncaglia. Here the jurists of Bologna appeared, armed with their new lore of Roman law, and expounded Justinian's code in the interests of the German empire. It was now seen how the absolutist doctrines of autocracy developed in Justinian's age at Byzantium would bear fruits in the development of an imperial idea, which was destined to be the fatal mirage of mediæval Italy. Frederick placed judges of his own appointment, with the title of podesta, in all the Lombard communes; and this stretch of his authority, while it exacerbated his foes, forced even his friends to join their ranks against him. The war, meanwhile, dragged on. Crema yielded after an heroic siege in 1160, and was abandoned to the cruelty of its fierce rival Cremona. Milan was invested in 1161, starved into capitulation after nine months' resistance, and given up to total destruction by the Italian imperialists of Frederick's army. So stained and tarnished with the vindictive passions of municipal rivalry was even this, the one great glorious strife of Italian annals! Having ruined his rebellious city, but not tamed her spirit, Frederick withdrew across the Alps. But, in the interval between his second and third visit, a league was formed against him in northeastern Lombardy. Verona, Vicenza, Padua, Treviso, Venice entered into a compact to defend their liberties; and when he came again in 1163 with a brilliant staff of German knights, the imperial cities refused to join his standards. This was the first and ominous sign of a coming change.

Meanwhile the election of Alexander III. to the papacy, in 1159, added a powerful ally to the republican party. Opposed by an anti-pope whom the emperor favored, Alexander found it was his truest policy to rely for support upon the anti-imperialist communes. They in return gladly accepted a champion who lent them the prestige and the influence of the church. When Frederick once more crossed the Alps in 1166, he advanced on Rome, and besieged Alexander in the Coliseum. But the affairs of Lombardy left him no leisure to persecute a recalcitrant pontiff. In April, 1167, a new league was formed between Cremona, Bergamo, Brescia, Mantua, and Ferrara. In December of the same year this league allied itself with the elder Veronese league, and received the addition of Milan, Lodi, Piacenza, Parma, Modena, and Bologna. The famous league of Lombard cities, styled Concordia in its acts of settlement, was now established. Novara, Vercelli, Como, Asti, and Tortona swelled its ranks; only Pavia and Montferrat remained imperialist between the Alps and Apennines. Frederick fled for his life by the Mont Cenis, and in 1168 the town of Alessandria was erected to keep Pavia and the marquisate in check. In the emperor's absence, Ravenna, Rimini, Imola and Forlì joined the league, which now called itself the "Society of Venice, Lombardy, the March, Romagna and Alessandria." For the fifth time, in 1174, Frederick entered his rebellious dominions. The fortress town of Alessandria stopped his progress with those mud walls contemptuously named "of straw," while the forces of the league assembled at Modena, and obliged him to raise the siege. In the spring of 1176 Frederick threatened Milan. His army found itself a little to the north of the town near the village of Legnano, when the troops of the city, assisted only by a few allies from Piacenza, Verona, Brescia, Novara and Vercelli, met and overwhelmed it. The victory was complete. Frederick escaped alone to Pavia, whence he opened negotiations with Alexander. In consequence of these transactions, he was suffered to betake himself unharmed to Venice. Here, as upon neutral ground, the emperor met the pope, and a truce for six years was concluded with the Lombard burghs. Looking back from the vantage-ground of history upon the issue of this long struggle, we are struck with the small results which satisfied the Lombard communes. They had humbled and utterly defeated their foreign lord. They had proved their strength in combination. Yet neither the acts by which their league was ratified nor the terms negotiated for them by their patron Alexander evince the smallest desire for what we now understand as national independence. The name of Italy is never mentioned. The supremacy of the emperor is not called in question. The conception of a permanent confederation, bound together in offensive and defensive alliance for common objects, has not occurred to these hard fighters and stubborn asserters of their civic privileges. All they claim is municipal autonomy; the right to manage their own affairs within the city walls, to fight their battles as they choose, and to follow their several ends unchecked. It is vain to lament that, when they might have now established Italian independence upon a secure basis, they chose local and municipal privileges. Their mutual jealousies, combined with the prestige of the empire, and possibly with the selfishness of the pope, who had secured his own position, and was not likely to foster a national spirit that would have threatened the ecclesiastical supremacy, deprived the Italians of the only great opportunity they ever had of forming themselves into a powerful nation.

When the truce expired in 1183, a permanent peace was ratified at Constance. The intervening years had been spent by the Lombards, not in consolidating their union, but in attempting to secure special privileges for their several cities. Alessandria della Paglia, glorious by her resistance to the emperor in 1174, had even changed her name to Cesarea! The signatories of the peace of Constance were divided between leaguers and imperialists. On the one side we find Vercelli, Novara, Milan, Lodi, Bergamo, Brescia, Mantua, Verona, Vicenza, Padua, Treviso, Bologna, Faenza, Modena, Reggio, Parma, Piacenza; on the other, Pavia, Genoa, Alba, Cremona, Como, Tortona, Asti, Cesarea. Venice, who had not yet entered the Italian community, is conspicuous by her absence. According to the terms of this treaty, the communes were confirmed in their right of self-government by consuls, and their right of warfare. The emperor retained the supreme courts of appeal within the cities, and his claim for sustenance at their expense when he came into Italy.

The privileges confirmed to the Lombard cities by the peace of Constance were extended to Tuscany, where Florence, having ruined Fiesole, had begun her career of freedom and prosperity. The next great chapter in the history of Italian evolution is the war of the burghs against the nobles. The consular cities were everywhere surrounded by castles; and, though the feudal lords had been weakened by the events of the preceding centuries, they continued to be formidable enemies. It was, for instance, necessary to the well-being of the towns that they should possess territory around their walls, and this had to be wrested from the nobles. We cannot linger over the details of this warfare. It must suffice to say that, partly by mortgaging their property to rich burghers, partly by entering the service of the cities as condottieri, partly by espousing the cause of one town against another, and partly by forced submission after the siege of their strong places, the counts were gradually brought into connection of dependence on the communes. These, in their turn, forced the nobles to leave their castles, and to reside for at least a portion of each year within the walls. By these measures the counts became citizens, the rural population ceased to rank as serfs, and the Italo-Roman population of the towns absorbed into itself the remnants of Franks, Germans, and other foreign stocks. It would be impossible to exaggerate the importance of this revolution, which ended by destroying the last vestige of feudality, and prepared that common Italian people which afterward distinguished itself by the creation of European culture. But, like all the vicissitudes of the Italian race, while it was a decided step forward in one direction, it introduced a new source of discord. The associated nobles proved ill neighbors to the peaceable citizens. They fortified their houses, retained their military habits, defied the consuls, and carried on feuds in the streets and squares. The war against the castles became a war against the palaces; and the system of government by consuls proved inefficient to control the clashing elements within the state. This led to the establishment of podestàs, who represented a compromise between two radically hostile parties in the city, and whose business it was to arbitrate and keep the peace between them. Invariably a foreigner, elected for a year with power of life and death and control of the armed force, but subject to a strict account at the expiration of his office, the podestà might be compared to a dictator invested with limited authority. His title was derived from that of Frederick Barbarossa's judges; but he had no dependence on the empire. The citizens chose him, and voluntarily submitted to his rule. The podestà marks an essentially transitional state in civic government, and his intervention paved the way for despotism.

The thirty years which elapsed between Frederick Barbarossa's death in 1190 and the coronation of his grandson Frederick II. in 1220 form one of the most momentous epochs in Italian history. Barbarossa, perceiving the advantage that would accrue to his house if he could join the crown of Sicily to that of Germany, and thus deprive the popes of their allies in Lower Italy, procured the marriage of his son Henry VI. to Constance, daughter of King Roger, and heiress of the Hauteville dynasty. When William II., the last monarch of the Norman race, died, Henry VI. claimed that kingdom in his wife's right, and was recognized in 1194.

Three years afterward he died, leaving a son, Frederick, to the care of Constance, who in her turn died in 1198, bequeathing the young prince, already crowned king of Germany, to the guardianship of Innocent III. It was bold policy to confide Frederick to his greatest enemy and rival; but the pope honorably discharged his duty, until his ward outgrew the years of tutelage, and became a fair mark for ecclesiastical hostility. Frederick's long minority was occupied by Innocent's pontificate. Among the principal events of that reign must be reckoned the foundation of the two orders, Franciscan and Dominican, who were destined to form a militia for the Holy See in conflict with the empire and the heretics of Lombardy. A second great event was the fourth crusade, undertaken in 1198, which established the naval and commercial supremacy of the Italians in the Mediterranean. The Venetians, who contracted for the transport of the crusaders, and whose blind doge Dandolo was first to land in Constantinople, received one-half and one-fourth of the divided Greek empire for their spoils. The Venetian ascendancy in the Levant dates from this epoch; for though the republic had no power to occupy all the domains ceded to it, Candia was taken, together with several small islands and stations on the mainland. The formation of a Latin empire in the East increased the pope's prestige; while at home it was his policy to organize Countess Matilda's heritage by the formation of Guelf leagues, over which he presided. This is the meaning of the three leagues, in the March, in the duchy of Spoleto, and in Tuscany, which now combined the chief cities of the papal territory into allies of the Holy See. From the Tuscan league Pisa, consistently Ghibelline, stood aloof. Rome itself again at this epoch established a republic, with which Innocent would not or could not interfere. The thirteen districts in their council nominated four *caporioni*, who acted in concert with a *senator*, appointed, like the podestà of other cities, for supreme judicial functions. Meanwhile the Guelf and Ghibelline factions were beginning to divide Italy into minute parcels. Not only did commune range itself against commune under the two rival flags, but party rose up against party within the city walls. The introduction of the factions into Florence in 1215, owing to a private quarrel between the Buondelmonti, Amidei, and Donati, is a celebrated instance of what was happening in every burgh.

Frederick II. was left without a rival for the imperial throne in 1218 by the death of Otto IV., and on November 22, 1220, Honorius III., Innocent's successor, crowned him in Rome. It was impossible for any section of the Italians to mistake the gravity of his access to power. In his single person he combined the prestige of empire with the crowns of Italy, Sicily, Sardinia, Germany, and Burgundy; and in 1225, by marriage with Yolande de Brienne, he added that of Jerusalem. There was no prince greater or more formidable on the habitable globe. The communes, no less than the popes, felt that they must prepare themselves for contest to the death with a power which threatened their existence. Already in 1218 the Guelfs of Lombardy had resuscitated their old league, and had been defeated by the Ghibellines in a battle near Ghibello. Italy seemed to lie prostrate before the emperor, who commanded her for the first time from the south as well as from the north. In 1227 Frederick, who had promised to lead a crusade, was excommunicated by Gregory IX. because he was obliged by illness to defer his undertaking; and thus the spiritual power declared war upon its rival. The Guelf towns of Lombardy again raised their levies. Frederick enlisted his Saracen troops at Nocera and Luceria, and appointed the terrible Ezzelino da Romano his vicar in the Marches of Verona to quell their insurrection. It was 1236, however, before he was able to take the field himself against the Lombards. Having established Ezzelino in Verona, Vicenza, and Padua, he defeated the Milanese and their allies at Cortenuova in 1237, and sent their carroccio as a trophy of his victory to Rome. Gregory IX. feared lest the Guelf party would be ruined by this check. He therefore made alliance with Venice and Genoa, fulminated a new excommunication against Frederick, and convoked a council at Rome to ratify his ban in 1241. The Genoese undertook to bring the French bishops to this council. Their fleet was attacked at Meloria by the Pisans, and utterly defeated. The French prelates went in silver chains to prison in the Ghibelline capital of Tuscany. So far Frederick had been successful at all points. In 1243 a new pope, Innocent IV., was elected, who prosecuted the war with still bitterer spirit. Forced to fly to France, he there, at Lyons, in 1245, convened a council, which enforced his condemnation of the emperor. Frederick's subjects were freed from their allegiance, and he was declared dethroned and deprived of all rights. Five times king and emperor as he was, Frederick, placed under the ban of the church, led henceforth a doomed existence. The mendicant monks stirred up the populace to acts of fanatical enmity. To plot against him, to attempt his life by poison or the sword, was accounted virtuous. His secretary, Piero delle Vigne, conspired against him. The crimes of his vicar Ezzelino, who laid whole provinces waste and murdered men by thousands in his Paduan prisons, increased the horror with which he was regarded. Parma revolted from him, and he spent months in 1247–48 vainly trying to reduce this one-time faithful city. The only gleam of success which shone on his ill fortune was the revolution which placed Florence in the hands of the Ghibellines in 1248. Next year Bologna rose against him, defeated his troops, and took his son Enzio, king of Sardinia, prisoner at Fossalta. Hunted to the ground and broken-hearted, Frederick expired at the end of 1250 in his Apulian castle of Fiorentino. It is difficult to judge his career with fairness. The only prince who could, with any probability of success, have established the German rule in Italy, his ruin proved the impossibility of that long-cherished scheme. The nation had outgrown dependence upon foreigners, and after his death no German emperor interfered with anything but miserable failure in Italian affairs. Yet from many points of view it might be regretted that Frederick was not suffered to rule Italy. By birth and breeding an Italian highly gifted and widely cultivated, liberal in his opinions, a patron of literature, a founder of universities, he anticipated the spirit of the Renaissance. At his court Italian started into being as a language. His laws were wise. He was capable of giving to Italy a large and noble culture. But the commanding greatness of his position proved his ruin. Emperor and king of Sicily, he was the natural enemy of popes, who could not tolerate so overwhelming a rival.

After Frederick's death, the popes carried on their war for eighteen years against his descendants. The cause of his son Conrad was sustained in Lower Italy by Manfred, one of Frederick's many natural children, and, when Conrad died in 1254, Manfred still acted as viceregent for the Swabians, who were now represented by a boy Conradin. Innocent IV. and Alexander IV. continued to make head against the Ghibelline party. The most dramatic incident in this struggle was the crusade preached against Ezzelino. This tyrant had made himself justly odious; and when he was hunted to death in 1259, the triumph was less for the Guelf cause than for humanity outraged by the iniquities of such a monster. The battle between Guelf and Ghibelline raged with unintermitting fury. While the former fac tion gained in Lombardy by the massacre of Ezzelino, the latter revived in Tuscany after the battle of Montaperti, which in 1260 placed Florence at the discretion of the Ghibellines. Manfred, now called king of Sicily, headed the Ghibellines, and there was no strong counterpoise against him. In this necessity Urban IV. and Clement IV. invited Charles of Anjou to enter Italy and take the Guelf command. They made him senator of Rome, and vicar of Tuscany, and promised him the investiture of the regno provided he stipulated that it should not be held in combination with the empire. Charles accepted these terms, and was welcomed by the Guelf party as their chief throughout Italy. He defeated Manfred in a battle at Grandella near Benevento in 1266. Manfred was killed; and, when Conradin, a lad of sixteen, descended from Germany to make good his claims to the kingdom, he, too, was defeated at Tagliacozzo in 1267. Less lucky than his uncle, Conradin escaped with his life, to die upon a scaffold at Naples. His glove was carried to his cousin Constance, wife of Peter of Aragon, the last of the great Norman-Swabian family. Enzio died in his prison four years later. The popes had been successful; but they had purchased their bloody victory at great cost. This first invitation to French princes brought with it incalculable evils.

Charles of Anjou, supported by Rome, and recognized as chief in Tuscany, was by far the most formidable of the Italian potentates. In his turn he now excited the jealousy of the popes, who began, though cautiously, to cast their weight into the Ghibelline scale. Gregory initiated the policy of establishing an equilibrium between the parties, which was carried out by his successor Nicholas III. Charles was forced to resign the senatorship of Rome and the signoria of Lombardy and Tuscany. In 1282 he received a more decided check, when Sicily rose against him in the famous rebellion of the Vespers. He lost the island, which gave itself to Aragon; and thus the kingdom of Sicily was severed from that of Naples, the dynasty in the one being Spanish and Ghibelline, in the other French and Guelf. Meanwhile a new emperor had been elected, the prudent Rudolf of Hapsburg, who abstained from interference with Italy, and who confirmed the territorial pretensions of the popes by solemn charter in 1278. Henceforth Emilia, Romagna, the March of Ancona, the patrimony of St. Peter, and the Campagna of Rome held of the Holy See, and not of the empire. The imperial chancery, without inquiring closely into the deeds furnished by the papal curia, made a deed of gift, which placed the pope in the position of a temporal sovereign. While Nicholas III. thus bettered the position of the church in Italy, the Guelf party grew stronger than ever, through the crushing defeat of the Pisans by the Genoese at Meloria in 1284. Pisa, who had ruined Amalfi, was now ruined by Genoa. She never held her head so high again after this victory, which sent her best and bravest citizens to die in the Ligurian dungeons. The Mediterranean was left to be fought for by Genoa and Venice, while Guelf Florence grew still more powerful in Tuscany. Not long after the battle of Meloria Charles of Anjou died, and was succeeded by his son Charles II. of Naples, who played no prominent part in Italian affairs. The Guelf party was held together with a looser hand, even in cities so consistent as Florence. Here, in the year 1300, new factions, subdividing the old Guelfs and Ghibellines under the names of Neri and Bianchi, had acquired such force that Boniface VIII., a violently Guelf pope, called in Charles of Valois to pacify the republic and undertake the charge of Italian affairs. Boniface was a passionate and unwise man. After quarreling with the French king, Philip le Bel, he fell into the hands of the Colonna family at Anagni, and died, either of the violence he there received or of mortification, in October, 1303.

After the short papacy of Benedict XI. a Frenchman, Clement V., was elected, and the seat of the papacy was transferred to Avignon. Thus began that Babylonian exile of the popes which placed them in subjection to the French crown, and ruined their prestige in Italy. Lasting seventy years, and joining on to the sixty years of the Great Schism, this enfeeblement of the papal authority, coinciding as it did with the practical elimination of the empire from Italian affairs, gave a long period of comparative independence to the nation. Nor must it be forgotten that this exile was due to the policy which induced the pontiffs, in their detestation of Ghibellinism, to rely successively upon the houses of Anjou and of Valois. This policy it was which justified Dante's fierce epigram—the *puttaneggiar co regi*.

The period we have briefly traversed was immortalized by Dante in an epic which from one point of view might be called the poem of the Guelfs and Ghibellines. From the foregoing bare narration of events it is impossible to estimate the importance of these parties, or to understand their bearing on subsequent Italian history. We are therefore forced to pause awhile, and probe beneath the surface. The civil wars may be regarded as a continuation of the previous municipal struggle, intensified by recent hostilities between the burghers and the nobles. The quarrels of the church and empire lend pretexts and furnish war cries; but the real question at issue is not the supremacy of pope or emperor. The conflict is a social one, between civic and feudal institutions, between commercial and military interests, between progress and conservatism. Guelf democracy and industry idealize the pope. The banner of the church waves above the camp of those who aim at positive prosperity and republican equality. Ghibelline aristocracy and immobility idealize the emperor. The prestige of the empire, based upon Roman law and feudal tradition, attracts imaginative patriots and systematic thinkers. The two ideals are counterposed and mutually exclusive. No city calls itself either Guelf or Ghibelline till it has expelled one-half of its inhabitants; for each party is resolved to constitute the state according to its own conception, and the affirmation of the one programme is the negation of the other. The Ghibelline honestly believes that the Guelfs will reduce society to chaos. The Guelf is persuaded that the Ghibelline will annihilate freedom and strangle commerce. The struggle is waged by two sets of men who equally love their city, but who would fain rule it upon diametrically opposite principles, and who fight to the death for its possession. This contradiction enters into the minutest details of life; armorial bearings, clothes, habits at table, symbolize and accentuate the difference. Meanwhile each party forms its own organization of chiefs, finance-officers, and registrars at home, and sends ambassadors to foreign cities of the same complexion. A network of party policy embraces and dominates the burghs of Italy, bringing the most distant centers into relation, and by the very division of the country augmenting the sense of nationality. The Italians learn through their discords at this epoch that they form one community. The victory in the conflict practically falls to the hitherto unenfranchised plebeians. The elder noble families die out or lose their preponderance. In some cities, as notably in Florence after the date 1292, it becomes criminal to be *scioperato*, or unemployed in industry. New houses rise into importance; a new commercial aristocracy is formed. Burghers of all denominations are enrolled in one or other of the arts or guilds, and these trading companies furnish the material from which the government or signoria of the city is composed. Plebeian handicrafts assert their right to be represented on an equality with learned professions and wealthy corporations. The ancient classes are confounded and obliterated in a population more homogeneous, more adapted for democracy and despotism.

In addition to the parliament and the councils which have been already enumerated, we now find a *council of the party* established within the city. This body tends to become a little state within the state, and, by controlling the victorious majority, disposes of the government as it thinks best. The consuls are merged in *ancients* or *priors*, chosen from the arts. A new magistrate, the *gonfalonier of justice*, appears in some of the Guelf cities, with the special duty of keeping the insolence of the nobility in check. Meanwhile the podestà still subsists; but he is no longer equal to the task of maintaining an equilibrium of forces. He sinks more and more into a judge, loses more and more the character of dictator. His ancient place is now occupied by a new functionary, no longer acting as arbiter, but concentrating the forces of the triumphant party. The *captain of the people*, acting as head of the ascendant Guelfs or Ghibellines, undertakes the responsibility of proscriptions, decides on questions of policy, forms alliances, declares war. Like all officers created to meet an emergency, the limitations to his power are ill-defined, and he is often little better than an autocrat.

Age of the Despots.

Thus the Italians, during the heat of the civil wars, were ostensibly divided between partisans of the empire and partisans of the church. After the death of Frederick II. their affairs were managed by Manfred and by Charles of Anjou, the supreme captains of the parties, under whose orders acted the captains of the people in each city. The contest being carried on by warfare, it followed that these captains in the burghs were chosen on account of military skill; and, since the nobles were men of arms by profession, members of ancient houses took the lead again in towns where they had been absorbed into the bourgeoisie. In this way, after the downfall of the Ezzelini of Romano, the Della Scala dynasty arose in Verona, and the Carraresi in Padua. The Estensi made themselves lords of Ferrara; the Torriani headed the Guelfs of Milan. At Ravenna we find the Polenta family, at Rimini the Malatestas, at Parma the Rossi, at Piacenza the Scotti, at Faenza the Manfredi. There is not a burgh of northern Italy but can trace the rise of a dynastic house to the vicissitudes of this period. In Tuscany, where the Guelf party was very strongly organized, and the commercial constitution of Florence kept the nobility in check, the communes remained as yet free from hereditary masters. Yet generals from time to time arose, the Conte Ugolino della Gheradesca at Pisa, Uguccione della Faggiuola at Lucca, the Conte Guido di Montefeltro at Florence, who threatened the liberties of Tuscan cities with military despotism.

Left to themselves by absentee emperors and exiled popes, the Italians pursued their own course of development unchecked. After the commencement of the fourteenth century, the civil wars decreased in fury, and at the same time it was perceived that their effect had been to confirm tyrants in their grasp upon free cities. Growing up out of the captain of the people or signore of the commune, the tyrant annihilated both parties for his own profit and for the peace of the state. He used the dictatorial powers with which he was invested, to place himself above the law, resuming in his person the state machinery which had preceded him. In him, for the first time, the city attained self-consciousness; the blindly working forces of previous revolutions were combined in the will of a ruler. The tyrant's general policy was to favor the multitude at the expense of his own caste. He won favor by these means, and completed the leveling down of classes, which had been proceeding ever since the emergence of the communes.

In 1309, Robert, grandson of Charles, the first Angevine sovereign, succeeded to the throne of Naples, and became the leader of the Guelfs in Italy. In the next year Henry VII. of Luxembourg crossed the Alps soon after his election to the empire, and raised the hopes of the Ghibellines. Dante, from his mountain solitudes, passionately called upon him to play the part of a Messiah. But it was now impossible for any German to control the "Garden of the Empire." Italy had entered on a new phase of her existence, and the great poet's *De Monarchia* represented a dream of the past which could not be realized. Henry established imperial vicars in the Lombard towns, confirming the tyrants, but gaining nothing for the empire in exchange for the titles he conferred. After receiving the crown in Rome, he died at Buonconvento, a little walled town south of Siena, on his backward journey in 1313. The profits of his inroad were reaped by despots, who used the Ghibelline prestige for the consolidation of their own power. It is from this epoch that the supremacy of the Visconti, hitherto the unsuccessful rivals of the Guelfic Torriani for the signory of Milan, dates. The Scaligers in Verona and the Carraresi in Padua were strengthened; and in Tuscany Castruccio Castracane, Uguccione's successor at Lucca, became formidable. In 1325 he defeated the Florentines at Alto Pascio, and carried home their carroccio as a trophy of his victory over the Guelfs. Louis of Bavaria, the next emperor, made a similar excursion in the year 1327, with even greater loss of imperial prestige. He deposed Galeazzo Visconti on his downward journey, and offered Milan for a sum of money to his son Azzo upon his return. Castruccio Castracane was nominated by him duke of Lucca; and this is the first instance of a dynastic title conferred upon an Italian adventurer by the emperor. Castruccio dominated Tuscany, where the Guelf cause, in the weakness of King Robert, languished. But the adventurer's death in 1328 saved the stronghold of republican institutions, and Florence breathed freely for awhile again. Can Grande della Scala's death in the next year inflicted on the Lombard Ghibellines a loss hardly inferior to that of Castruccio's on their Tuscan allies. Equally contemptible in its political results and void of historical interest was the brief visit of John of Bohemia, son of Henry VII., whom the Ghibellines next invited to assume their leadership. He sold a few privileges, conferred a few titles, and recrossed the Alps in 1333. It is clear that at this time the fury of the civil wars was spent. In spite of repeated efforts on the part of the Ghibellines, in spite of King Robert's supine incapacity, the imperialists gained no permanent advantage. The Italians were tired of fighting, and the leaders of both factions looked exclusively to their own interests. Each city which had been the cradle of freedom thankfully accepted a master, to quench the conflagration of party strife, encourage trade, and make the handicraftsman comfortable. Even the Florentines, in 1342, submitted for a few months to the despotism of the duke of Athens. They conferred the signory upon him for life; and, had he not mismanaged matters, he might have held the city in his grasp. Italy was settling down and turning her attention to home comforts, arts, and literature. Boccaccio, the contented bourgeois, succeeded to Dante, the fierce aristocrat.

The most marked proof of the change which came over Italy toward the middle of the fourteenth century is furnished by the companies of adventure. It was with their own militia that the burghers won freedom in the war of independence, subdued the nobles, and fought the battles of the parties. But from this time forward they laid down their arms, and played the game of warfare by the aid of mercenaries. Ecclesiastical overlords, interfering from a distance in Italian politics; prosperous republics, with plenty of money to spend but no leisure or inclination for camp-life; cautious tyrants, glad of every pretext to emasculate their subjects, and courting popularity by exchanging conscription for taxation—all combined to favor the new system. Mercenary troops are said to have been first levied from disbanded Germans, together with Breton and English adventurers, whom the Visconti and Castruccio took into their pay. They soon appeared under their own captains, who hired them out to the highest bidder, or marched them on marauding expeditions up and down the less protected districts. The names of some of these earliest captains of adventure, Fra Moriale, Count Lando, and Duke Werner, who styled himself the "Enemy of God and Mercy," have been preserved to us. As the companies grew in size and improved their discipline, it was seen by the Italian nobles that this kind of service offered a good career for men of spirit, who had learned the use of arms. To leave so powerful and profitable a calling in the hands of foreigners seemed both dangerous and uneconomical. Therefore, after the middle of the century, this profession fell into the hands of natives. The first Italian who formed an exclusively Italian company was Alberico da Barbiano, a nobleman of Romagna, and founder of the Milanese house of Belgiojoso. In his school the great condottieri Braccio da Montone and Sforza Attendolo were formed; and henceforth the battles of Italy were fought by Italian generals commanding native troops. This was better in some respects than if the mercenaries had been foreigners. Yet it must not be forgotten that the new companies of adventure, who decided Italian affairs for the next century, were in no sense patriotic. They sold themselves for money, irrespective of the cause which they upheld; and, while changing masters, they had no care for any interests but their own. The name condottiero, derived from *condotta*, a paid contract to supply so many fighting men in serviceable order, sufficiently indicates the nature of the business. In the hands of able captains, like Francesco Sforza or Piccinino, these mercenary troops became moving despotisms, draining the country of its wealth, and always eager to fasten and found tyrannies upon the provinces they had been summoned to defend. Their generals substituted heavy-armed cavalry for the old militia, and introduced systems of campaigning which reduced the art of war to a game of skill. Battles became all but bloodless; diplomacy and tactics superseded feats of arms and hard blows in pitched fields. In this way the Italians lost their military vigor, and wars were waged by despots from their cabinets, who pulled the strings of puppet captains in their pay. Nor were the people only enfeebled for resistance to a real foe; the whole political spirit of the race was demoralized. The purely selfish bond between condottieri and their employers, whether princes or republics, involved intrigues and treachery, checks and counterchecks, secret terror on the one hand and treasonable practice on the other, which ended by making statecraft in Italy synonymous with perfidy.

It must further be noticed that the rise of mercenaries was synchronous with a change in the nature of Italian despotism. The tyrants, as we have already seen, established themselves as captains of the people, vicars of the empire, vicars for the church, leaders of the Guelf and Ghibelline parties. They were accepted by a population eager for repose, who had merged old class distinctions in the conflicts of preceding centuries. They rested, in large measure, on the favor of the multitude, and pursued a policy of sacrificing to their interests the nobles. It was natural that these self-made princes should seek to secure the peace which they had promised in their cities, by freeing the people from military service and disarming the aristocracy. As their tenure of power grew firmer, they advanced dynastic claims, assumed titles, and took the style of petty sovereigns. Their government became paternal; and, though there was no limit to their cruelty when stung by terror, they used the purse rather than the sword, bribery at home and treasonable intrigue abroad in preference to coërcive measures or open war. Thus was elaborated the type of despot which attained completeness in Gian Galeazzo Visconti and Lorenzo de' Medici. No longer a tyrant of Ezzelino's stamp, he reigned by intelligence and terrorism masked beneath a smile. He substituted cunning and corruption for violence. The lesser people tolerated him because he extended the power of their city and made it beautiful with public buildings. The bourgeoisie, protected in their trade, found it convenient to support him. The nobles, turned into courtiers, placemen, diplomatists, and men of affairs, ended by preferring his authority to the alternative of democratic institutions. A lethargy of well-being, broken only by the pinch of taxation for war-costs, or by outbursts of frantic ferocity and lust in the less calculating tyrants, descended on the population of cities which had boasted of their freedom. Only Florence and Venice, at the close of the period upon which we are now entering, maintained their republican independence. And Venice was ruled by a close oligarchy; Florence was passing from the hands of her oligarchs into the power of the Medicean merchants.

Between the years 1305, when Clement V. settled at Avignon, and the year 1447, when Nicholas V. reëstablished the papacy upon a solid basis at Rome, the Italians approximated more nearly to self-government than at any other epoch of their history. The conditions which have been described, of despotism, mercenary warfare, and bourgeois prosperity, determined the character of this epoch, which was also the period when the great achievements of the Renaissance were prepared. At the end of this century and a half, five principal powers divided the peninsula; and their confederated action during the next forty-five years (1447–1492) secured for Italy a season of peace and brilliant prosperity. These five powers were the kingdom of Naples, the duchy of Milan, the republic of Florence, the republic of Venice, and the papacy. The subsequent events of Italian history will be rendered most intelligible if at this point we trace the development of these five constituents of Italian greatness separately.

When Robert of Anjou died in 1343, he was succeeded by his granddaughter Joan, the childless wife of four successive husbands, Andrew of Hungary, Louis of Taranto, James of Aragon, and Otto of Brunswick. Charles of Durazzo, the last male scion of the Angevine house in Lower Italy, murdered Joan in 1382, and held the kingdom for five years. Dying in 1387, he transmitted Naples to his son Ladislaus, who had no children, and was followed in 1414 by his sister Joan II. She, too, though twice married, died without issue, having at one time adopted Louis III. of Provence and his brother René, at another Alfonzo V. of Aragon, who inherited the crown of Sicily. After her death in February, 1435, the kingdom was fought for between René of Anjou and Alfonso, surnamed the Magnanimous. René found supporters among the Italian princes, especially the Milanese Visconti, who helped him to assert his claims with arms. During the war of succession which ensued, Alfonso was taken prisoner by the Genoese fleet, in August, 1435, and was sent a prisoner to Filippo Maria at Milan. Here he pleaded his own cause so powerfully, and proved so incontestably the advantage which might ensue to the Visconti from his alliance, if he held the regno, that he obtained his release and recognition as king. From the end of the year 1435 Alfonso reigned alone and undisturbed in Lower Italy, combining for the first time since the year 1282 the crowns of Sicily and Naples. The former he held by inheritance, together with that of Aragon. The latter he considered to be his by conquest. Therefore, when he died in 1458, he bequeathed Naples to his natural son Ferdinand, while Sicily and Aragon passed together to his brother John, and so on to Ferdinand the Catholic. The twenty-three years of Alfonso's reign were the most prosperous and splendid period of South Italian history. He became an Italian in taste and sympathy, entering with enthusiasm into the humanistic ardor of the earlier Renaissance, encouraging men of letters at his court, administering his kingdom on the principles of an enlightened despotism, and lending his authority to establish that equilibrium in the peninsula upon which the politicians of his age believed, not without reason, that Italian independence might be secured.

The last member of the Visconti family of whom we had occasion to speak was Azzo, who bought the city in 1328 from Louis of Bavaria. His uncle Lucchino succeeded, but was murdered in 1349 by a wife against whose life he had been plotting. Lucchino's brother John, archbishop of Milan, now assumed the lordship of the city, and extended the power of the Visconti over Genoa and the whole of North Italy, with the exception of Piedmont, Verona, Mantua, Ferrara, and Venice. The greatness of the family dates from the reign of this masterful prelate. He died in 1354, and his heritage was divided between three members of his house, Matteo, Bernabo, and Galeazzo. In the next year Matteo, being judged incompetent to rule, was assassinated by order of his brothers, who made an equal partition of their subject cities—Bernabo residing in Milan, Galeazzo in Pavia. Galeazzo was the wealthiest and most magnificent Italian of his epoch. He married his daughter Violante to the duke of Clarence, and his son Gian Galeazzo to a daughter of King John of France. When he died in 1378, this son resolved to reunite the domains of the Visconti; and, with this object in view, he plotted and executed the murder of his uncle Bernabo. Gian Galeazzo thus became by one stroke the most formidable of Italian despots. Immured in his castle at Pavia, accumulating wealth by systematical taxation and methodical economy, he organized the mercenary troops who eagerly took service under so good a paymaster; and, by directing their operations from his cabinet, he threatened the whole of Italy with conquest. The last scions of the Della Scala family still reigned in Verona, the last Carraresi in Padua; the Estensi were powerful in Ferrara, the Gonzaghi in Mantua. Gian Galeazzo, partly by force and partly by intrigue, discredited these minor despots, pushed his dominion to the very verge of Venice, and, having subjected Lombardy to his sway, proceeded to attack Tuscany. Pisa and Perugia were threatened with extinction, and Florence dreaded the advance of the Visconti arms, when the plague suddenly cut short his career of treachery and conquest in the year 1402. Seven years before his death Gian Galeazzo bought the title of duke of Milan and count of Pavia from the emperor Wenceslaus, and there is no doubt that he was aiming at the sovereignty of Italy. But no sooner was he dead than the essential weakness of an artificial state, built up by cunning and perfidious policy, with the aid of bought troops, dignified by no dynastic title, and consolidated by no sense of loyalty, became apparent. Gian Galeazzo's duchy was a masterpiece of mechanical contrivance, the creation of a scheming intellect and lawless will. When the mind which had planned it was withdrawn, it fell to pieces, and the very hands which had been used to build it helped to scatter its fragments. The Visconti's own generals, Facino Cane, Pandolfo Malatesta, Jacopo dal Verme, Gabrino Fondulo, Ottobon Terzo, seized upon the tyranny of several Lombard cities. In others the petty tyrants whom the Visconti had uprooted reäppeared. The Estensi recovered their grasp upon Ferrara, and the Gonzaghi upon Mantua. Venice strengthened herself between the Adriatic and the Alps. Florence reassumed her Tuscan hegemony. Other communes which still preserved the shadow of independence, like Perugia and Bologna, began once more to dream of republican freedom under their own leading families. Meanwhile Gian Galeazzo had left two sons, Giovanni Maria and Filippo Maria. Giovanni, a monster of cruelty and lust, was assassinated by some Milanese nobles in 1412; and now Filippo set about rebuilding his father's duchy. Herein he was aided by the troops of Facino Cane, who, dying opportunely at this period, left considerable wealth, a well-trained band of mercenaries and a widow, Beatrice di Tenda. Filippo married and then beheaded Beatrice after a mock trial for adultery, having used her money and her influence in reuniting several subject cities to the crown of Milan. He subsequently spent a long, suspicious, secret and incomprehensible career in the attempt to piece together Gian Galeazzo's Lombard state, and to carry out his schemes of Italian conquest. In this endeavor he met with vigorous opponents. Venice and Florence, strong in the strength of their resentful oligarchies, offered a determined resistance; nor was Filippo equal in ability to his father. His infernal cunning often defeated its own aims, checkmating him at the point of achievement by suggestions of duplicity or terror. In the course of Filippo's wars with Florence and Venice, the greatest generals of this age were formed—Francesco Carmagnola, who was beheaded between the columns at Venice in 1432; Niccolo Piccinino, who died at Milan in 1444; and Francesco Sforza, who survived to seize his master's heritage in 1450. Son of Attendolo Sforza, this Francesco received the hand of Filippo's natural daughter, Bianca, as a reward for past service and a pledge of future support. When the Visconti dynasty ended by the duke's death in 1447, he pretended to espouse the cause of the Milanese republic, which was then reëstablished; but he played his cards so subtly as to make himself, by the help of Cosimo de' Medici in Florence, duke *de facto* if not *de jure*. Francesco Sforza was the only condottiero among many aspiring to be tyrants who planted himself firmly on a throne of first-rate importance. Once seated in the duchy of Milan, he displayed rare qualities as a ruler; for he not only entered into the spirit of the age, which required humanity and culture from a despot, but he also knew how to curb his desire for territory. The conception of confederated Italy found in him a vigorous supporter. Thus the limitation of the Milanese duchy under Filippo Maria Visconti, and its consolidation under Francesco Sforza, were equally effectual in preparing the balance of power to which Italian politics now tended.

This balance could not have been established without the concurrent aid of Florence. After the expulsion of the duke of Athens in 1343, and the great plague of 1348, the Florentine proletariate rose up against the merchant princes. This insurgence of the artisans, in a republic which had been remodeled upon economical principles by Giano della Bella's constitution of 1292, reached a climax in 1378, when the Ciompi rebellion placed the city for a few years in the hands of the Lesser Arts. The revolution was but temporary, and was rather a symptom of democratic tendencies in the state than the sign of any capacity for government on the part of the working classes. The necessities of war and foreign affairs soon placed Florence in the power of an oligarchy headed by the great Albizzi family. They fought the battles of the republic with success against the Visconti, and widely extended the Florentine domain over the Tuscan cities. During their season of ascendancy Pisa was enslaved, and Florence gained the access to the sea. But throughout this period a powerful opposition was gathering strength. It was led by the Medici, who sided with the common people, and increased their political importance by the accumulation and wise employment of vast commercial wealth. In 1433 the Albizzi and the Medici came to open strife. Cosimo de' Medici, the chief of the opposition, was exiled to Venice. In the next year he returned, assumed the presidency of the democratic party, and by a system of corruption and popularity-hunting, combined with the patronage of arts and letters, established himself as the real but unacknowledged dictator of the commonwealth. Cosimo abandoned the policy of his predecessors. Instead of opposing Francesco Sforza in Milan, he lent him his prestige and influence, foreseeing that the dynastic future of his own family and the pacification of Italy might be secured by a balance of power in which Florence should rank on equal terms with Milan and Naples.

The republic of Venice differed essentially from any other state in Italy; and her history was so separate that, up to this point, it would have been needless to interrupt the narrative by tracing it. Venice, however, in the fourteenth century took her place at last as an Italian power on an equality at least with the very greatest. The constitution of the commonwealth had slowly matured itself through a series of revolutions, which confirmed and defined a type of singular stability. During the earlier days of the republic the doge had been a prince elected by the people, and answerable only to the popular assemblies. In 1032 he was obliged to act in concert with a senate, called *pregadi;* and in 1172 the grand council, which became the real sovereign of the state, was formed. The several steps whereby the members of the grand council succeeded in eliminating the people from a share in the government, and reducing the doge to the position of their ornamental representative, cannot here be described. It must suffice to say that these changes culminated in 1297, when an act was passed for closing the grand council, or in other words for confining it to a fixed number of privileged families, in whom the government was henceforth vested by hereditary right. This ratification of the oligarchical principle, together with establishment in 1311 of the Council of Ten, completed that famous constitution which endured till the extinction of the republic in 1797. Meanwhile, throughout the Middle Ages, it had been the policy of Venice to refrain from conquests on the Italian mainland, and to confine her energies to commerce in the East. The first entry of any moment made by the Venetians into strictly Italian affairs was in 1336, when the republics of Florence and St. Mark allied themselves against Mastino della Scala, and the latter took possession of Treviso. After this, for thirty years, between 1352 and 1381, Venice and Genoa contested the supremacy of the Mediterranean. Pisa's maritime power having been extinguished in the battle of Meloria (1284), the two surviving republics had no rivals. They fought their duel out upon the Bosporus, off Sardinia, and in the Morea, with various successes. From the first great encounter, in 1355, Venice retired well-nigh exhausted, and Genoa was so crippled that she placed herself under the protection of the Visconti. The second and decisive battle was fought upon the Adriatic. The Genoese fleet under Luciano Doria defeated the Venetians off Pola in 1379, and sailed without opposition to Chioggia, which was stormed and taken. Thus the Venetians found themselves blockaded in their own lagoons. Meanwhile a fleet was raised for their relief by Carlo Zeno in the Levant, and the admiral Vittore Pisani, who had been imprisoned after the defeat at Pola, was released to lead their forlorn hope from the city side. The Genoese in their turn were now blockaded in Chioggia, and forced by famine to surrender. The losses of men and money which the war of Chioggia, as it was called, entailed, though they did not immediately depress the spirit of the Genoese republic, signed her naval ruin. During this second struggle to the death with Genoa, the Venetians had been also at strife with the Carraresi of Padua and the Scaligers of Verona. In 1406, after the extinction of these princely houses, they added Verona, Vicenza, and Padua to the territories they claimed on *terra firma.* Their career of conquest, and their new policy of forming Italian alliances and entering into the management of Italian affairs, were confirmed by the long dogeship of Francesco Foscari (1423–1457), who must rank with Alfonso, Cosimo de' Medici, Francesco Sforza, and Nicholas V., as a joint-founder of confederated Italy. When Constantinople fell in 1453, the old ties between Venice and the Eastern empire were broken, and she now entered on a wholly new phase of her history. Ranking as one of the five Italian powers, she was also destined to defend Western Christendom against the encroachments of the Turk in Europe.

By their settlement in Avignon, the popes relinquished their protectorate of Italian liberties, and lost their position as Italian potentates. Rienzi's revolution in Rome (1347–1354), and his establishment of a republic upon a fantastic basis, half classical, half feudal, proved the temper of the times; while the rise of dynastic families in the cities of the church, claiming the title of papal vicars, but acting in their own interests, weakened the authority of the Holy See. The predatory expeditions of Bertrand du Poiet and Robert of Geneva were as ineffective as the descents of the emperors; and, though the cardinal Albornoz conquered Romagna and the March in 1364, the legates who resided in those districts were not long able to hold them against their despots. At last Gregory XI. returned to Rome; and Urban VI., elected in 1378, put a final end to the Avignonian exile. Still the Great Schism, which now distracted Western Christendom, so enfeebled the papacy, and kept the Roman pontiffs so engaged in ecclesiastical disputes, that they had neither power nor leisure to occupy themselves seriously with their temporal affairs. The threatening presence of the two princely houses of Orsini and Colonna, alike dangerous as friends or foes, rendered Rome an unsafe residence. Even when the schism was nominally terminated in 1415 by the council of Constance, the next two popes held but a precarious grasp upon their Italian domains. Martin V. (1417–1431) resided principally at Florence. Eugenius IV. (1431–1447) followed his example; and what Martin managed to regain Eugenius lost. At the same time, the change which had now come over Italian politics, the desire on all sides for a settlement, and the growing conviction that a federation was necessary, proved advantageous to the popes as sovereigns. They gradually entered into the spirit of their age, assumed the style of despots, and made use of the humanistic movement, then at its height, to place themselves in a new relation to Italy. The election of Nicholas V. in 1447 determined this revolution in the papacy, and opened a period of temporal splendor, which ended with the establishment of the popes as sovereigns. Thomas of Sarzana was a distinguished humanist. Humbly born, he had been tutor in the house of the Albizzi, and afterward librarian of the Medici at Florence, where he imbibed the politics together with the culture of the Renaissance. Soon after assuming the tiara, he found himself without a rival in the church; for the schism ended by Felix V.'s resignation in 1449. Nicholas fixed his residence in Rome, which he began to rebuild and to fortify, determining to render the Eternal City once more a capital worthy of its high place in Europe. The Romans were flattered; and, though his reign was disturbed by republican conspiracy, Nicholas V. was able before his death in 1455 to secure the modern status of the pontiff as a splendid patron and a wealthy temporal potentate.

Italy was now for a brief space independent. The humanistic movement had created a common culture, a common language, and sense of common nationality. The five great powers, with their satellites—dukes of Savoy and Urbino, marquises of Ferrara and Mantua, republics of Bologna, Perugia, Siena—were constituted. All political institutions tended toward despotism. The Medici became yearly more indispensable to Florence, the Bentivogli more autocratic in Bologna, the Baglioni in Perugia; and even Siena was ruled by the Petrucci. But this despotism was of a mild type. The princes were Italians; they shared the common enthusiasms of the nation for art, learning, literature, and science; they studied how to mask their tyranny with arts agreeable to the multitude. When Italy had reached this point, Constantinople was taken by the Turks. On all sides it was felt that the Italian alliance must be tightened; and one of the last and best acts of Nicholas V.'s pontificate was the appeal in 1453 to the five great powers in federation. As regards their common opposition to the Turk, this appeal led to nothing; but it marked the growth of a new Italian consciousness.

Between 1453 and 1492 Italy continued to be prosperous and tranquil. Nearly all wars during this period were undertaken either to check the growing power of Venice or to further the ambition of the papacy. Having become despots, the popes sought to establish their relatives in principalities. The word nepotism acquired new significance in the reigns of Sixtus IV. and Innocent VIII. Though the country was convulsed by no great struggle, these forty years witnessed a truly appalling increase of political crime. To be a prince was tantamount to being the mark of secret conspiracy and assassination. Among the most noteworthy examples of such attempts may be mentioned the revolt of the barons against Ferdinand I. of Naples (1464), the murder of Galeazzo Maria Sforza at Milan (1476), and the plot of the Pazzi to destroy the Medici (1478). After Cosimo de' Medici's death in 1464, the presidency of the Florentine republic passed to his son Piero, who left it in 1469 to his sons Lorenzo and Giuliano. These youths assumed the style of princes, and it was against their lives that the Pazzi, with the sanction of Sixtus IV., aimed their blow. Giuliano was murdered. Lorenzo escaped to tighten his grasp upon the city, which now loved him and was proud of him. During the following fourteen years of his brilliant career, he made himself absolute master of Florence, and so modified her institutions that the Medici were henceforth necessary to the state. Apprehending the importance of Italian federation, Lorenzo, by his personal tact and prudent leadership of the republic, secured peace and a common intelligence between the five powers. His own family was fortified by the marriage of his daughter to a son of Innocent VIII., which procured his son Giovanni's elevation to the cardinalate, and involved two Medicean papacies and the future dependence of Florence upon Rome.

Age of Invasions.

The year 1492 opened a new age for Italy. In this year Lorenzo died, and was succeeded by his son, the vain and weak Piero; France passed beneath the personal control of the inexperienced Charles VIII.; the fall of Granada freed Spain from her embarrassments; Columbus discovered America, destroying the commercial supremacy of Venice; last, but not least, Roderigo Borgia assumed the tiara with the famous title of Alexander VI. In this year the short-lived federation of the five powers was shaken, and Italy was once more drawn into the vortex of European affairs. The events which led to this disaster may be briefly told. After Galeazzo Maria's assassination, his crown passed to a boy, Gian Galeazzo, who was in due course married to a granddaughter of Ferdinand I. of Naples. But the government of Milan remained in the hands of this youth's uncle, Lodovico, surnamed Il Moro. Lodovico resolved to become duke of Milan. The king of Naples was his natural enemy, and he had cause to suspect that Piero de' Medici might abandon his alliance. Feeling himself alone, with no right to the title he was bent on seizing, he had recourse to Charles VIII. of France, whom he urged to make good his claim to the kingdom of Naples. This claim, it may be said in passing, rested on the will of King René of Anjou. After some hesitation, Charles agreed to invade Italy. He crossed the Alps in 1494, passed through Lombardy, entered Tuscany, freed Pisa from the yoke of Florence, witnessed the expulsion of the Medici, marched to Naples, and was crowned there—all this without striking a blow. Meanwhile Lodovico procured his nephew's death, and raised a league against the French in Lombardy. Charles hurried back from Naples, and narrowly escaped destruction at Fornovo in the passes of the Apennines. He made good his retreat, however, and returned to France in 1495. Little remained to him of his light acquisitions; but he had convulsed Italy by this invasion, destroyed her equilibrium, exposed her military weakness and political disunion, and revealed her wealth to greedy and more powerful nations.

The princes of the house of Aragon, now represented by Frederick, a son of Ferdinand I., returned to Naples. Florence made herself a republic, adopting a form of constitution analogous to that of Venice. At this crisis she was ruled by the monk Girolamo Savonarola, who inspired the people with a thirst for freedom, preached the necessity of reformation, and placed himself in direct antagonism to Rome. After a short but eventful career, the influence of which was long effective, he lost his hold upon the citizens. Alexander VI. procured a mock trial, and his enemies burned him upon the Piazza in 1498. In this year Louis XII. succeeded Charles VIII. upon the throne of France. As duke of Orleans he had certain claims to Milan through his grandmother Valentina, daughter of Gian Galeazzo, the first duke. They were not valid, for the investiture of the duchy had been granted only to male heirs. But they served as a sufficient pretext, and in 1499 Louis entered the country and subdued the Milanese. Lodovico escaped to Germany.

returned the next year, was betrayed by his Swiss mercenaries, and sent to die at Loches in France. In 1501 Louis made the blunder of calling Ferdinand the Catholic to help him in the conquest of Naples. By a treaty signed at Granada, the French and Spanish kings were to divide the spoil. The conquest was easy; but, when it came to a partition, Ferdinand played his ally false. He made himself supreme over the Two Sicilies, which he now reunited under a single crown. Three years later, unlessoned by this experience, Louis signed the treaty of Blois (1504), whereby he invited the emperor Maximilian to aid him in the subjugation of Venice. No policy could have been less far-sighted, for Charles V., joint heir to Austria, Burgundy, Castile, and Aragon, the future overwhelming rival of France, was already born.

The stage was now prepared, and all the actors who were destined to accomplish the ruin of Italy trod it with their armies. Spain, France, Germany, with their Swiss auxiliaries, had been summoned upon various pretexts to partake her provinces. Then, too late, patriots like Machiavelli perceived the suicidal self-indulgence of the past, which, by substituting mercenary troops for national militias, left the Italians at the absolute discretion of their neighbors. Whatever parts the Italians themselves played in the succeeding quarter of a century, the game was in the hands of French, Spanish and German invaders. Meanwhile, no scheme for combination against common foes arose in the peninsula. Each petty potentate strove for his own private advantage n the confusion; and at this epoch the chief gains accrued to the papacy. Aided by his terrible son, Cesare Borgia, Alexander VI. chastised the Roman nobles, subdued Romagna and the March, threatened Tuscany, and seemed to be upon the point of creating a Central Italian state in favor of his progeny, when he died suddenly in 1503. His conquests reverted to the Holy See. Julius II., his bitterest enemy and powerful successor, continued Alexander's policy, but no longer in the interest of his own relatives. It became the nobler ambition of Julius to aggrandize the church, and to reassume the protectorate of the Italian people. With this object he secured Emilia, carried his victorious arms against Ferrara, and curbed the tyranny of the Baglioni in Perugia. Julius II. played a perilous game; but the stakes were high, and he fancied himself strong enough to guide the tempest he evoked. Quarreling with the Venetians in 1508, he combined the forces of all Europe by the league of Cambray against them; and, when he had succeeded in his first purpose of humbling them even to the dust, he turned around in 1510, uttered his famous resolve to expel the barbarians from Italy, and pitted the Spaniards against the French. It was with the Swiss that he hoped to effect the revolution; but the Swiss, now interfering for the first time as principals in Italian affairs, were incapable of more than adding to the already maddening distractions of the people. Formed for mercenary warfare, they proved a perilous instrument in the hands of those who used them, and were hardly less injurious to their friends than to their foes. In 1512 the battle of Ravenna between the French troops and the allies of Julius—Spaniards, Venetians, and Swiss—was fought. Gaston de Foix bought a doubtful victory dearly with his death; and the allies, though beaten on the banks of the Ronco, immediately afterward expelled the French from Lombardy. Yet Julius II. had failed, as might have been foreseen. He only exchanged one set of foreign masters for another, and taught a new barbarian race how pleasant were the plains of Italy. As a consequence of the battle of Ravenna, the Medici returned in 1512 to Florence.

When Leo X. was elected in 1513, Rome and Florence rejoiced; but Italy had no repose. Louis XII. had lost the game, and the Spaniards were triumphant. But new actors appeared upon the scene, and the same old struggle was resumed with fiercer energy. By the victory of Marignano in 1515 Francis I., having now succeeded to the throne of France, regained the Milanese, and broke the power of the Swiss, who held it for Massimiliano Sforza, the titular duke. Leo for awhile relied on Francis; for the vast power of Charles V., who succeeded to the empire in 1519, as in 1516 he had succeeded to the crowns of Spain and Lower Italy, threatened the whole of Europe. It was Leo's nature, however, to be inconstant. In 1521 he changed sides, allied himself to Charles, and died after hearing that the imperial troops had again expelled the French from Milan. During the next four years the Franco-Spanish war dragged on in Lombardy until the decisive battle of Pavia in 1525, when Francis was taken prisoner, and Italy lay open to the Spanish armies. Meanwhile Leo X. had been followed by Adrian VI., and Adrian by Clement VII., of the house of Medici, who had long ruled Florence. In the reign of this pope Francis was released from his prison in Madrid (1526), and Clement hoped that he might still be used in the Italian interest as a counterpoise to Charles. It is impossible in this place to follow the tangled intrigues of that period. The year 1527 was signalized by the famous sack of Rome. An army of mixed German and Spanish troops, pretending to act for the emperor, but which may rather be regarded as a vast marauding party, entered Italy under their leader Frundsberg. After his death, the Constable de Bourbon took command of them; they marched slowly down, aided by the marquis of Ferrara, and unopposed by the duke of Urbino, reached Rome, and took it by assault. The constable was killed in the first onslaught; Clement was imprisoned in the castle of St. Angelo; Rome was abandoned to the rage of 30,000 ruffians. As an immediate result of this catastrophe, Florence shook off the Medici, and established a republic. But Clement, having made peace with the emperor, turned the remnants of the army which had sacked Rome against his native city. After a desperate resistance, Florence fell in 1530. Alessandro de' Medici was placed there with the title of duke of Cività di Penna; and, on his murder in 1537, Cosimo de' Medici, of the younger branch of the ruling house, was made duke. Acting as lieutenant for the Spaniards, he subsequently (1555) subdued Siena, and bequeathed to his descendants the grand-duchy of Tuscany.

Spanish-Austrian Ascendancy.

It was high time, after the sack of Rome in 1527, that Charles V. should undertake Italian affairs. The country was exposed to anarchy, of which this had been the last and most disgraceful example. The Turks were threatening Western Europe, and Luther was inflaming Germany. By the treaty of Barcelona in 1529 the pope and emperor made terms. By that of Cambray in the same year France relinquished Italy to Spain. Charles then entered the port of Genoa, and on November 5th met Clement VII. at Bologna. He there received the imperial crown, and summoned the Italian princes for a settlement of all disputed claims. Francesco Sforza, the last and childless heir of the ducal house, was left in Milan till his death, which happened in 1535. The republic of Venice was respected in her liberties and Lombard territories. The Este family received a confirmation of their duchy of Modena and Reggio, and were invested in their fief of Ferrara by the pope. The marquisate of Mantua was made a duchy; and Florence was secured, as we have seen, to the Medici. The great gainer by this settlement was the papacy, which held the most substantial Italian province, together with a prestige that raised it far above all rivalry. The rest of Italy, however parceled, henceforth became but a dependency of Spain. Charles V., it must be remembered, achieved his conquest and confirmed his authority far less as emperor than as the heir of Castile and Aragon. A Spanish viceroy in Milan and another in Naples, supported by Rome and by the minor princes who followed the policy dictated to them from Madrid, were sufficient to preserve the whole peninsula in a state of somnolent, inglorious servitude.

From 1530 until 1796, that is for a period of nearly three centuries, the Italians had no history of their own. Their annals are filled with records of dynastic changes and redistributions of territory, consequent upon treaties signed by foreign powers in the settlement of quarrels which nowise concerned the people. Italy only too often became the theater of desolating and distracting wars. But these wars were fought, for the most part, by alien armies; the points at issue were decided beyond the Alps; the gains accrued to royal families whose names were unpronounceable by southern tongues. The affairs of Europe during the years when Hapsburg and Bourbon fought their domestic battles with the blood of noble races may teach grave lessons to all thoughtful men of our days, but none bitterer, none fraught with more insulting recollections, than to the Italian people, who were haggled over like dumb, driven cattle in the mart of chaffering kings. We cannot wholly acquit the Italians of their share of blame. When they might have won national independence, after their warfare with the Swabian emperors, they let the golden opportunity slip. Pampered with commercial prosperity, eaten to the core with interurban rivalries, they submitted to despots, renounced the use of arms, and offered themselves, in the hour of need, defenseless and disunited to the shock of puissant nations. That they had created modern civilization for Europe availed them nothing. Italy, intellectually first among the peoples, was now politically and practically last; and nothing to her historian is more heart-rending than to watch the gradual extinction of her spirit in this age of slavery.

In 1534 Alessandro Farnese, who owed his elevation to his sister Giulia, one of Alexander VI.'s mistresses, took the tiara with the title of Paul III. It was his ambition to create a duchy for his family; and with this object he gave Parma and Piacenza to his son Pier Luigi. After much wrangling between the French and Spanish parties, the duchy was confirmed in 1586 to Ottaviano Farnese and his son Alessandro, better known as Philip II.'s general, the prince of Parma. Alessandro's descendants reigned in Parma and Piacenza till the year 1731. Paul III.'s pontificate was further marked by important changes in the church, all of which confirmed the spiritual autocracy of Rome. In 1540 this pope approved of Loyola's foundation, and secured the powerful militia of the Jesuit order. The Inquisition was established with almost unlimited powers in Italy, and the press was placed under its jurisdiction. Thus free thought received a check, by which not only ecclesiastical but political tyrants knew how to profit. Henceforth it was impolitic to publish or utter a word which might offend the despots of church or state; and the Italians had to amuse their leisure with the polite triflings of academies. In 1545 a council was opened at Trent for the reformation of church discipline and the promulgation of orthodox doctrine. The decrees of this council defined Roman Catholicism against the Reformation; and, while failing to regenerate morality, they enforced a hypocritical observance of public decency. Italy, to outer view, put forth blossoms of hectic and hysterical piety, though at the core her clergy and her aristocracy were more corrupt than ever.

In 1556 Philip II., by the abdication of his father, Charles V., became king of Spain. He already wore the crown of the Two Sicilies, and ruled the duchy of Milan. In the next year Ferdinand, brother of Charles, was elected emperor. The French, meanwhile, had not entirely abandoned their claims on Italy. Gian Pietro Caraffa, who was made pope in 1555 with the name of Paul IV., endeavored to revive the ancient papal policy of leaning upon France. He encouraged the duke of Guise to undertake the conquest of Naples, as Charles of Anjou had been summoned by his predecessors. But such schemes were now obsolete and anachronistic. They led to a languid, lingering Italian campaign, which was settled far beyond the Alps by Philip's victories over the French at St. Quentin and Gravelines. The peace of Câteau Cambresis, signed in 1559, left the Spanish monarch undisputed lord of Italy. Of free commonwealths there now survived only Venice, which, together with Spain, achieved for Europe the victory of Lepanto in 1573; Genoa, which, after the ineffectual Fieschi revolution in 1547, abode beneath the rule of the great Doria family, and held a feeble sway in Corsica, and the two insignificant republics of Lucca and San Marino.

The future hope of Italy, however, was growing in a remote and hitherto neglected corner. A clause in the treaty of Câteau Cambresis recognized the right of Emmanuele Filiberto, duke of Savoy, to Piedmont. He owed this recognition, as Alessandro owed his duchy of Parma, to the fact that he was one of Philip's bravest generals. Yet Emmanuele Filiberto represented the oldest and not the least illustrious reigning house in Europe, and his descendants were destined to achieve for Italy the independence which no other power or prince had given her since the fall of ancient Rome. It is, therefore, needful at this point to trace the history of the counts of Savoy from the date of their first emergence on the stage of Italian politics.

In the tenth century the founders of the house of Savoy were masters over Burgundy and Western Lombardy. Their provinces stretched beyond what is now called Savoy on the west and north, and southward touched the Mediterranean at Savona. In the course of the next two centuries the family divided. Its elder branch ruled Savoy and the northern shores of Lake Geneva. The younger line held Piedmont with the city of Turin for capital. The former were frequently at war with the dauphins of Vienne and the house of Hapsburg, seeking to extend their domains in the direction of Switzerland and Provence. The latter proved but ill neighbors to the marquises of Montferrat and Saluzzo. When the first league of the Swiss was formed, the counts of Savoy were vigorously driven back within their northern borders. At the same time the powers of France repelled them from Provence. Intrenched within their mountains, they now looked toward Italy for expansion. This southward growth of a state which had hitherto been undefined between its cisalpine and transalpine provinces was further determined by the union of the two branches of the family in the person of Amadeus VIII. Succeeding to the honors of the elder line in 1391, he joined Piedmont to Savoy in 1418, and received the title of duke from the emperor Sigismund. During his lifetime he annexed Saluzzo, took Chivasso from Montferrat, and received Vercelli from Filippo Maria Visconti. Nice had already joined itself to Savoy in 1388. The duchy of Savoy, checked in its development upon the further side of the Alpine barrier, gained in solidity and extent upon the south, and took rank definitely from this time forward as a considerable Italian power. Amadeus was one of the most remarkable personages of his day. Having built up the fortunes of his house by diplomatic ability in an age of policy and intrigue, he abdicated in 1434, and went into cloisteral retirement at Ripaille. Hence he emerged in 1440 to receive the papal tiara from the council of Basel. He took the name of Felix V., but resigned in 1449, leaving Nicholas V. sole pope. When he died in 1451, he had reigned for sixty-one years as count, duke, prior of a hermit convent, anti-pope, and dean of the Holy College. The immediate successors of Amadeus VIII. undid a great deal of his work. They entered into unprofitable warfare with Geneva, Freiburg, Bern, and Vaud, and were still further shorn of territory and prestige upon the side of Switzerland. The French invaded Savoy, and their Lombard domains became the theater of the Franco-Spanish wars. When Emmanuele Filiberto succeeded to his father Charles III. in 1553, he was a duke without a duchy. But the princes of the house of Savoy were a race of warriors; and what Emmanuele Filiberto lost as sovereign he regained as captain of adventure in the service of his cousin Philip II. The treaty of Câteau Cambresis in 1559, and the evacuation of the Piedmontese cities held by French and Spanish troops in 1574, restored his state. By removing the capital from Chambéry to Turin, he completed the transformation of the dukes of Savoy from Burgundian into Italian sovereigns. They still own Savoy beyond the Alps, the plains of Bresse, and the maritime province of Nice.

Emmanuele Filiberto was succeeded by his son Carlo Emmanuele I., who married Catherine, a daughter of Philip II. He seized the first opportunity of annexing Saluzzo, which had been lost to Savoy in the last two reigns, and renewed the disastrous policy of his grandfather Charles III. by invading Geneva and threatening Provence. Henry IV. of France forced him in 1601 to relinquish Bresse and his Burgundian possessions. In return he was allowed to keep Saluzzo. All hope of conquest on the transalpine side were now quenched; but the keys of Italy had been given to the dukes of Savoy, and their attention was still further concentrated upon Lombard conquests. Carlo Emmanuele now attempted the acquisition of Montferrat, which was soon to become vacant by the death of Francesco Gonzaga, who held it together with Mantua. In order to secure this territory, he went to war with Philip III. of Spain, and allied himself with Venice and the Grisons to expel the Spaniards from the Valtelline. When the male line of the Gonzaga family expired in 1627, Charles, duke of Nevers, claimed Mantua and Montferrat in right of his wife, the only daughter of the last duke. Carlo Emmanuele was now checkmated by France, as he had formerly been by Spain. The total gains of all his strenuous endeavors amounted to the acquisition of a few places on the borders of Montferrat.

Not only the Gonzagas, but several other ancient ducal families, died out about the date which we have reached. The legitimate line of the Estensi ended in 1597 by the death of Alfonso II., the last duke of Ferrara. He left his domains to a natural relative, Cesare d'Este, who would in earlier days have inherited without dispute, for bastardy had been no bar on more than one occasion in the Este pedigree. Urban VIII., however, put in a claim to Ferrara, which, it will be remembered, had been recognized a papal fief in 1530. Cesare d'Este had to content himself with Modena and Reggio, where his descendants reigned as dukes till 1794. Under the same pontiff, the Holy See absorbed the duchy of Urbino on the death of Francesco Maria II., the last representative of Montefeltro and Della Rovere. The popes were now masters of a fine and compact territory, embracing no inconsiderable portion of Countess Matilda's legacy, in addition to Pippin's donation and the patrimony of St. Peter. Meanwhile Spanish fanaticism, the suppression of the Huguenots in France, and the Catholic policy of Austria combined to strengthen their authority as pontiffs. Urban's predecessor, Paul V., advanced so far as to extend his spiritual jurisdiction over Venice, which, up to the date of his election (1605), had resisted all encroachments of the Holy See. Venice offered the single instance in Italy of a national church. The republic managed the tithes, and the clergy acknowledged no chief above their own patriarch. Paul V. now forced the Venetians to admit his ecclesiastical supremacy; but they refused to readmit the Jesuits, who had been expelled in 1606. This, if we do not count the proclamation of James I. of England (1604), was the earliest instance of the order's banishment from a state where it had proved disloyal to the commonwealth.

Venice rapidly declined throughout the seventeenth century. The loss of trade consequent upon the closing of Egypt and the Levant, together with the discovery of America and the sea-route to the Indies, had dried up her chief source of wealth. Prolonged warfare with the Ottomans, who forced her to abandon Candia in 1669, as they had robbed her of Cyprus in 1570, still further crippled her resources. Yet she kept the Adriatic free of pirates, notably by suppressing the sea-robbers called Uscocchi (1601–1617), maintained herself in the Ionian Islands, and in 1684 added one more to the series of victorious episodes which rendered her annals so romantic. In that year Francesco Morosini, upon whose tomb we still may read the title Peloponnesiacus, wrested the whole of the Morea from the Turks. But after his death in 1715 the republic relaxed her hold upon his conquests. The Venetian nobles abandoned themselves to indolence and vice. Many of them fell into the slough of pauperism, and were saved from starvation by public doles. Though the signory still made a brave show upon occasions of parade, it was clear that the state was rotten to the core, and sinking into the decrepitude of dotage. The Spanish monarchy at the same epoch dwindled with apparently less reason. Philip's Austrian successors reduced it to the rank of a secondary European power. This decline of vigor was felt, with the customary effects of discord and bad government, in Lower Italy. The revolt of Masaniello in Naples (1647), followed by rebellions at Palermo and Messina, which placed Sicily for awhile in the hands of Louis XIV. (1676–1678), were symptoms of progressive anarchy. The population, ground down by preposterous taxes, ill-used as only the subjects of Spaniards, Turks, or Bourbons are handled, rose in blind exasperation against their oppressors. It is impossible to attach political importance to these revolutions; nor did they bring the people any appreciable good. The destinies of Italy were decided in the cabinets and on the battlefields of Northern Europe. A Bourbon at Versailles, a Hapsburg at Vienna, or a thick-lipped Lorrainer, with a stroke of his pen, wrote off province against province, regarding not the populations who had bled for him or thrown themselves upon his mercy.

This inglorious and passive chapter of Italian history is continued to the date of the French Revolution with the records of three dynastic wars, the war of the Spanish succession, the war of the Polish succession, the war of the Austrian succession, followed by three European treaties, which brought them respectively to diplomatic terminations. Italy, handled and rehandled, settled and resettled, upon each of these occasions, changed masters without caring or knowing what befel the principals in any one of the disputes. Humiliating to human nature in general as are the annals of the eighteenth century campaigns in Europe, there is no point of view from which they appear in a light so tragicomic as from that afforded by Italian history. The system of setting nations by the ears with the view of settling the quarrels of a few reigning houses was reduced to absurdity when the people, as in these cases, came to be partitioned and exchanged without the assertion or negation of a single principle affecting their interests or rousing their emotions.

In 1700 Charles II. died, and with him ended the Austrian family in Spain. Louis XIV. claimed the throne for Philip, duke of Anjou. Charles, archduke of Austria, opposed him. The dispute was fought out in Flanders; but Lombardy felt the shock, as usual, of the French and Austrian dynasties. The French armies were more than once defeated by Prince Eugene of Savoy, who drove them out of Italy in 1707. Therefore, in the peace of Utrecht (1713), the services of the house of Savoy had to be duly recognized. Vittorio Amedeo II. received Sicily with the title of king. Montferrat and Alessandria were added to his northern provinces, and his state was recognized as independent. Charles of Austria, now emperor, took Milan, Mantua, Naples, and Sardinia for his portion of the Italian spoil. Philip founded the Bourbon line of Spanish kings, renouncing in Italy all that his Hapsburg predecessors had gained. Discontented with this diminution of the Spanish heritage, Philip V. married Elisabetta Farnese, heiress to the last duke of Parma, in 1714. He hoped to secure this duchy for his son, Don Carlos; and Elisabetta further brought with her a claim to the grand-duchy of Tuscany, which would soon become vacant by the death of Gian Gastone de' Medici. After this marriage Philip broke the peace of Europe by invading Sardinia. The Quadruple Alliance was formed, and the new king of Sicily was punished for his supposed adherence to Philip V. by the forced exchange of Sicily for the island of Sardinia. It was thus that in 1720 the house of Savoy assumed the legal title which it bore until the declaration of the Italian kingdom in this century. Vittorio Amedeo II.'s reign was of great importance in the history of his state. Though a despot, as all monarchs were obliged to be at that date, he reigned with prudence, probity, and zeal for the welfare of his subjects. He took public education out of the hands of the Jesuits, which, for the future development of manliness in his dominions, was a measure of incalculable value. The duchy of Savoy in his days became a kingdom, and Sardinia, though it seemed a poor exchange for Sicily, was a far less perilous possession than the larger and wealthier island would have been. In 1730 Vittorio Amedeo abdicated in favor of his son Carlo Emmaneule III. Repenting of this step, he subsequently attempted to regain Turin, but was imprisoned in the castle of Rivoli, where he ended his days in 1732.

The war of the Polish succession which now disturbed Europe is only important in Italian history because the treaty of Vienna in 1738 settled the disputed affairs of the duchies of Parma and Tuscany. The duke Antonio Farnese died in 1731; the grand-duke Gian Gastone de' Medici died in 1737. In the duchy of Parma Don Carlos had already been proclaimed. But he was now transferred to the Two Sicilies, while Francis of Lorraine, the husband of Maria Theresa, took Tuscany and Parma. Milan and Mantua remained in the hands of the Austrians. On this occasion Carlo Emmanuele acquired Tortona and Novara.

Worse complications ensued for the Italians when the emperor Charles VI., father of Maria Theresa, died in 1740. The three branches of the Bourbon house, ruling in France, Spain, and the Sicilies, joined with Prussia, Bavaria, and the kingdom of Sardinia to despoil Maria Theresa of her heritage. Lombardy was made the seat of war; and here the king of Sardinia acted as in some sense the arbiter of the situation. After war broke out, he changed sides and supported the Hapsburg-Lorraine party. At first, in 1745, the Sardinians were defeated by the French and Spanish troops. But Francis of Lorraine, elected emperor in that year, sent an army to the king's support, which in 1746 obtained a signal victory over the Bourbons at Piacenza. Carlo Emmanuele now threatened Genoa. The Austrian soldiers already held the town. But the citizens expelled them, and the republic kept her independence. In 1748 the treaty of Aix-la-Chapelle, which put an end to the war of the Austrian succession, once more redivided Italy. Parma, Piacenza, and Guastalla were formed into a duchy for Don Philip, brother of Charles III. of the Two Sicilies, and son of Philip V. of Spain. Charles III. was confirmed in his kingdom of the Two Sicilies. The Austrians kept Milan and Tuscany. The duchy of Modena was placed under the protection of the French. So was Genoa, which in 1755, after Paoli's insurrection against the misgovernment of the republic, ceded her old domain of Corsica to France.

From the date of this settlement until 1792, Italy enjoyed a period of repose and internal amelioration under her numerous paternal despots. It became the fashion during these forty-four years of peace to encourage the industrial population and to experimentalize in economical reforms. The emperor Francis I. ruled the grand-duchy of Tuscany by lieutenants until his death in 1765, when it was given, as an independent state, to his third son, Peter Leopold. The reign of this duke was long remembered as a period of internal prosperity, wise legislation, and important public enterprise. Leopold, among other useful works, drained the Val di Chiana, and restored those fertile upland plains to agriculture. In 1790 he succeeded to the empire, and left Tuscany to his son Ferdinand. The kingdom of Sardinia was administered upon similiar principles, but with less of geniality. Carlo Emmanuele made his will law, and erased the remnants of free institutions from his state. At the same time he wisely followed his father's policy with regard to education and the church. This is perhaps the best that can be said of a king who incarnated the stolid absolutism of the period. From this date, however, we are able to trace the revival of independent thought among the Italians. The European ferment of ideas which preceded the French Revolution expressed itself in men like Alfieri, the fierce denouncer of tyrants, Beccaria, the philosopher of criminal jurisprudence, Volta, the physicist, and numerous political economists of Tuscany. Moved partly by external influences and partly by a slow internal reawakening, the people was preparing for the efforts of the present century. The papacy, during this period, had to reconsider the question of the Jesuits, who made themselves universally odious, not only in Italy, but also in France and Spain. In the pontificate of Clement XIII. they ruled the Vatican, and almost succeeded in embroiling the pope with the concerted Bourbon potentates of Europe. His successor, Clement XIV., suppressed the order altogether by a brief of 1773.

Achievement of Independence.

The malarious tranquillity of Italy beneath her Austrian and Bourbon despots was rudely shaken by the French Revolution. This is not the place to describe Napoleon's campaign of 1796. But the treaty of Campo Formio, which resettled Italy in 1797, has to be described. Northern and Central Italy were redivided into four republics—the Cisalpine, with its capital in Milan; the Ligurian, with Genoa for capital; the Cispadane, with Bologna; the Tiberine, with Rome; Venice (where the last doge, Luigi Manini, had dissolved the republic of St. Mark amid the execrations of the populace in the month of May) was flung, together with her territory between the Adige and the Adriatic as a compensation for other losses, to the Austrian empire. In the next year, 1798, Lower Italy became the Parthenopæan republic, with Naples for its capital. Carlo Emmanuele III., now king of Sardinia, resigned his dominions. Pius VI. fled from Rome, and died in France in 1799. The whole of the old order of the peninsula was thus destroyed at a blow. Yet the people, at first, gained little but an exchange of masters, increased taxes, and a participation in the doubtful glories of the French republic. While Bonaparte was absent in Egypt, his recent settlement of Italian affairs was upset, and the French were everywhere driven out of the peninsula by force of arms. He returned, and Marengo (1800) made him once more master of Italy. Four years later, having proclaimed himself emperor, he took the Lombard crown in St. Ambrogio at Milan. Italy now ranked as his kingdom, and a new settlement of her provinces had to be effected. The pope was left in Rome, and Ferdinand in Naples. Tuscany was rechristened the kingdom of Etruria, and given to the Bourbons. The Ligurian and Cisalpine republics were placed under the viceroy Eugene Beauharnais. After Austerlitz, Venice was added to this North Italian kingdom; and in 1806 Bonaparte made the Bourbons yield Naples to his brother Joseph. When Joseph went in 1808 to Madrid, Joachim Murat succeeded him as king in Naples. Sicily remained in the hands of Ferdinand. In 1809 Pius VII. was deposed, and sent to France, and Rome was declared a part of the French empire. The gingerbread kingdom of Etruria was abolished, and Bonaparte's sister, Eliza, wife of a Colonel Bacciocchi, was made duchess of Tuscany, with the titles of duchess of Lucca and princess of Piombino. Ephemeral as were Bonaparte's successive divisions and redivisions of Italy into provinces for his generals and relatives, they exercised no little influence. From the period of the French rule we may date a new sense of nationality among Italians, generated by the military service of recruits drawn together from all districts in Napoleon's armies, by the temporary obliteration of most ancient boundaries, by the dethronement of alien and unloved princes, by the equal administration of one code of laws, and by the spirit of the revolution which animated all French institutions. Italy began to feel herself a nation, and though it was long before Europe suffered her to win national rights, the demand for them, which in our own days became too imperious to be resisted, was created in her people at this epoch.

The congress of Vienna in 1815 took down from the theater of Italy all Bonaparte's decorations, and set up the old scenery in very nearly the old places. Vittorio Emmanuele I. received back his kingdom of Sardinia, with the addition of Genoa. Venice and Milan were formed into the province of Lombardo-Venezia for Francis II., emperor of Austria. The old duchy of Parma was given for her lifetime to Maria Louisa, who, though the wife of Bonaparte, was still an Austrian princess. Upon her death it was to be restored to its former Bourbon princes, who received in the meanwhile Lucca as an equivalent. The Austrian Ferdinand III. was once again grand-duke of Tuscany, with the reversion of Lucca after Maria Louisa's decease. Francis, son of the Austrian archduke Ferdinand and Beatrice d'Este, became duke of Modena, with the reversion of Lunigiana on the same event. Pius VII. got back all the states of the church, and on his reentry into Rome restored the Jesuits, who had proved their indispensability to tyrants. The Bourbon Ferdinand I. again joined Naples to his crown of Sicily. We have been careful to label these Ferdinands and Francises with their respective names of Austrian and Bourbon, in order that the partition of Italy between the two dynasties, and the large preponderance of Austrian over Bourbon influence, might be apparent. One significant detail has been omitted. The congress of Vienna recognized the independent republic of San Marino. On the top of a little mountain at the outskirts of the Apennines which overlook the sea by Rimini, sat Liberty, the queen of a few hundred citizens, surveying the muddy ocean of Franco-Spanish, Italo-Teutonic despotism which drowned Italy through all her length and breadth.

The Italian sovereigns, on returning to their respective states, proved that exile and the revolution had terrorized them into more determined tyranny. The civil and political reforms which had been instituted at the end of the last century were abandoned. The Jesuits were restored; many suppressed monasteries were reëstablished; and the mortmain laws were repealed. Elementary education was narrowed in its limits, and thrown into the hands of the clergy. Professors suspected of liberal views were expelled from the universities, and the press was placed under the most rigid supervision. All persons who had taken part in the Napoleonic governments, or who were known to entertain patriotic opinions, found themselves harassed, watched, spied upon, and reported. The cities swarmed with police agents and informers. The passport system was made more stringent, and men were frequently refused even a few days' leave of absence from their homes. The Code Napoléon was withdrawn from those provinces which had formed part of the Italian kingdom, while, in the papal states, the administration was placed again in the hands of ecclesiastics.

This political and spiritual reign of terror, which had for its object the crushing of Italian liberalism, was sanctioned and supported by Austria. Each petty potentate bound himself to receive orders from Vienna, and, in return for this obedience, the emperor guaranteed him in the possession of his throne. The Lombardo-Venetian kingdom, powerfully defended and connected with Austria by land and sea, became one huge fortress, garrisoned with armed men, in perpetual menace of the country. Under these conditions the Italians were half maddened, and thousands of otherwise quiet citizens, either in the hope of finding redress and protection, or only from a feeling of revenge, joined secret revolutionary societies; for it must not be supposed that the revolution had left the Italians as passive as it found them. A new spirit was astir, which was not likely to be checked by the arrangements of the European congress—the spirit of national independence. During the convulsions caused by Napoleon's conquest of Italy, the allied powers had themselves fostered this spirit, in order to oppose French rule. The Austrians, the English, and Murat, in turn, had publicly invited the Italians to fight for their national independence. And now the people, who relied upon these proclamations and expected the fulfillment of so many promises, found themselves by the consent of Europe delivered over, tied and gagged, to a foreign oppressor. To take but one example: Ferdinand, when he quitted Naples in May, 1815, addressed a proclamation to his subjects, solemnly engaging to respect the laws that should in his absence be decreed by a constitution. In June he pledged himself at Vienna to introduce into his kingdom no institutions irreconcilable with those which Austria might establish in her own dependencies. Accordingly in 1816 he put an end to the Sicilian constitution of 1812.

Tyranny was met by conspiracy, and in a short while, the Carbonari societies, with Sanfedisti and many other revolutionary associations, had extended their organization through the length and breadth of the peninsula. The discontent of the Italians smoldered for five years; but in 1820 it broke into open flame. On January 1st in that year the Spaniards proclaimed their constitution of the Cortes, which was modeled on the type furnished by the earlier French Revolution. Moved by this example, the royal army mutinied at Naples in July, and a few days afterward Palermo rushed to arms. Ferdinand was so surprised by the sudden outbreak of this revolt that he hastily granted the constitution, named his son Francis vicar-general of his kingdom, and betook himself to Austria. The Austrians marched 80,000 men into Lombardy, and Great Britain and France sent their fleets down to the Bay of Naples. At a congress held in the spring of 1821 at Laybach, the allied powers authorized Austria to crush the revolution in Lower Italy. Austrian troops entered Naples on March 23d; and, when Ferdinand followed them, he had nothing to do but to execute vengeance, by mock trials, on his insurgent subjects.

While these events were taking place, another military insurrection broke out at Piedmont, where the Spanish constitution was proclaimed. The king felt himself bound by the congress of Laybach, and refused to make any concessions. Therefore, on March 13th, he abdicated; and in the absence of his brother and heir, Carlo Felice, his distant cousin, Carlo Alberto, prince of Carignano, was appointed regent. Carlo Alberto represented a branch of the reigning house, which had been separated nearly two centuries from the throne. Educated, during the French occupation, more like a private citizen than like a prince, he grew up with liberal inclinations, and there is no doubt that his concessions to the insurrectionists in Piedmont at this moment were actuated by sympathy rather than by any vulgar desire to gain power. When, however, Carlo Felice returned and declared that his brother's abdication had been forced and therefore illegal, Carlo Alberto's sense of loyalty to the dynasty overcame his liberal instincts. He submitted to the new king's authority, and the old regime was reëstablished in Piedmont on as absolute a basis as before.

These movements were followed by state trials and executions, and the terrorism of the tyrannies augmented. Silvio Pellico, at the close of an inefficient disturbance at Milan, was sent to life-imprisonment at Spielberg. In the papal states, Leo XII. adopted a coërcive policy still more grinding and humiliating. For nine years the despots and the conspirators confronted each other, until the July revolution of Paris in 1830 gave new hope and energy to the latter. On this occasion the conflagration burst out at Modena, where the duke Francesco IV. had been, for some time past, in secret negotiation with the patriotic party headed by Ciro Menotti. It appears that the secret object of this autocrat was to employ the revolution against his neighbors, and to make himself sovereign of upper Italy by the help of the conspirators. But when the revolution declared itself, and spread to Parma, Bologna, and the Romagna, Francesco turned upon his friend Menotti, and succeeded in putting him to death. It took but little time or trouble to check this revolt, which was unsupported by armed force. Austrian troops moved into Emilia and Romagna, restored the old order, and marched on to Rome, which they occupied. Louis Philippe, now king of the French, being jealous of the Austrians at Rome, occupied Ancona for the French in 1832; but the cause of Italian liberty received no support from the bourgeois king, who strove to keep on good terms with established authorities.

From 1831 until 1846 Italy remained discontentedly and uneasily tranquil. The infamous misgovernment of Rome and Naples continued; and in Lower Italy numerous petty insurrections, caused by the misery of the people, and the cholera which raged in 1837, were easily suppressed. Yet it was clear to all competent observers that this state of things could not last. The Italian sovereigns were seated over a volcano, which vibrated to the least stir in its neighbor, France, and which was slowly accumulating explosive material. Among the most powerful instruments now invented by the party of independence must be reckoned the scientific congress. This body, ostensibly formed for the study of science, assembled every year in some Italian city. Its meetings really served to propagate liberal opinions and to establish relations between the patriots of different districts. Meanwhile the great men who were destined to achieve the future union of Italy had appeared upon the stage, and were busy through this period with their pen and voice. Giuseppe Mazzini, born in 1808 at Genoa, made himself the recognized head of a party called by the name of Young Italy. It was his aim to organize the forces of the revolution, and to establish the one and indivisible republic in Europe. Though he strove in the cause of Italy, his scheme for the regeneration of society far exceeded the limits of that country. He declared war upon established order in its ancient forms all over the world, and was willing to use conspiracy, if not assassination, in order to achieve his ends. Thus, though the spirit infused into the Italians by Mazzini's splendid eloquence aroused the people to a sense of their high destinies and duties, though he was the first to believe firmly that Italy could and would be one free nation, yet the means he sanctioned for securing this result, and the policy which was inseparable from his opinions, proved obstacles to statesmen of more practical and sober views. It was the misfortune of Italy at this epoch that she had not only to fight for independence, but also to decide upon the form of government which the nation should elect when it was constituted. All right-thinking and patriotic men agreed in their desire to free the country from foreign rule, and to establish national self-government. But should they aim at a republic or a constitutional monarchy? Should they be satisfied with the hegemony of Piedmont? Should they attempt a confederation, and if so, how should the papacy take rank, and should the petty sovereigns be regarded as sufficiently Italian to hold their thrones? These and many other hypothetical problems distracted the Italian patriots. It was impossible for them, in the circumstances, first to form the nation and then to decide upon its government; for the methods to be employed in fighting for independence already implied some political principle. Mazzini's manipulation of conspiracy, for instance, was revolutionary and republican; while those who adhered to constitutional order, and relied upon the arms of Piedmont, had virtually voted for Sardinian hegemony. The unanimous desire for independence existed in a vague and nebulous condition. It needed to be condensed into workable hypotheses; but this process could not be carried on without the growth of sects perilous to common action.

The party of Young Italy, championed by Mazzini, was the first to detach itself, and to control the blindly working forces of the Carbonari movement by a settled plan of action. It was the programme of Young Italy to establish a republic by the aid of volunteers recruited from all parts of the peninsula. When Carlo Alberto came to the throne, Mazzini addressed him a letter, as equal unto equal, calling upon the king to defy Austria and rely upon God and the people. Because Carlo Alberto (who, in spite of his fervent patriotism and genuine liberality of soul, was a man of mixed opinions, scrupulous in his sense of constitutional obligation, melancholy by temperament, and superstitiously religious) found himself unwilling or unable to take this step, the Mazzinisti denounced him as a traitor to 1821 and a retrogressive autocrat. In his exile at Geneva, Mazzini now organized an armed attempt on Savoy. He collected a few hundred refugees of all nations, and crossed the frontier in 1833. But this feeble attack produced no result beyond convincing Carlo Alberto that he could not trust the republicans. Subsequent attempts on the king's life roused a new sense of loyalty in Piedmont, and defined a counter-body of opinion to Mazzini's. The patriots of a more practical type, who may be called moderate liberals, began, in one form or another, to aim at achieving the independence of Italy constitutionally by the help of the Sardinian kingdom. What rank Sardinia would take in the new Italy remained an open question. The publication of Vincenzo Gioberti's treatise, *Il Primato morale e civile degli Italiani*, in 1843, considerably aided the growth of definite opinion. His utopia was a confederation of Italian powers, under the spiritual presidency of the papacy, and with the army of Piedmont for sword and shield. This book had an immense success. It made timid thinkers feel that they could join the liberals without sacrificing their religious or constitutional opinions. At the same date Cesare Balbo's *Speranza d'Italia* exercised a somewhat similar influence, through its sound and unsubversive principles. In its pages Balbo made one shrewd guess, that the Eastern Question would decide Italian independence. Massimo d'Azeglio, who also was a Piedmontese; the poet Giusti, the Baron Ricasoli, and the Marchese Gino Capponi in Tuscany; together with Alessandro Manzoni at Milan, and many other writers scattered through the provinces of Italy, gave their weight to the formation of this moderate liberal party. These men united in condemning the extreme democracy of the Mazzinisti, and did not believe that Italy could be regenerated by merely manipulating the insurrectionary force of the revolution. On political and religious questions they were much divided in detail, suffering in this respect from the weakness inherent in liberalism. Yet we are already justified in regarding this party as a sufficient counterpoise to the republicans; and the man who was destined to give it coherence, and to win the great prize of Italian independence by consolidating and working out its principles in practice, was already there. The count Camillo Benso di Cavour had been born in 1810, two years later than Mazzini. He had not yet entered upon his ministerial career, but was writing articles for the *Risorgimento*, which at Turin opposed the Mazzinistic journal *Concordia*, and was devoting himself to political and economical studies. It is impossible to speak of Mazzini and Cavour without remembering the third great regenerator of Italy, Giuseppe Garibaldi. At this date he was in exile; but a few years later he returned, and began his career of popular deliverance in Lombardy. Mazzini, the prophet, Garibaldi, the knight-errant, and Cavour, the statesman, of Italian independence, were all natives of Sardinia. But their several positions in it were so different as to account in no small measure for the very divergent parts they played in the coming drama. Mazzini was a native of Genoa, which ill tolerated the enforced rule of Turin. Garibaldi came from Nice, and was a child of the people. Cavour was born in the midst of that stiff aristocratical society of old Piedmont which has been described so vividly by D'Azeglio in his *Ricordi*. The Piedmontese nobles had the virtues and the defects of English country squires in the last century. Loyal, truthful, brave, hard-headed, tough in resistance, obstinately prejudiced, they made excellent soldiers, and were devoted servants of the crown. Moreover, they hid beneath their stolid exterior greater political capacity than the more genial and brilliant inhabitants of Southern and Central Italy. Cavour came of this race, and understood it. But he was a man of exceptional quality. He had the genius of statesmanship—a practical sense of what could be done, combined with rare dexterity in doing it, fine diplomatic and parliamentary tact, and noble courage in the hour of need. Without the enthusiasm, amounting to the passion of a new religion, which Mazzini inspired, without Garibaldi's brilliant achievements, and the idolatry excited by this pure-hearted hero in the breasts of all who fought with him and felt his sacred fire, there is little doubt that Cavour would not have found the creation of United Italy possible. But if Cavour had not been there to win the confidence, support and sympathy of Europe, if he had not been recognized by the body of the nation as a man whose work was solid and whose sense was just in all emergencies, Mazzini's efforts would have run to waste in questionable insurrections, and Garibaldi's feats of arms must have added but one chapter more to the history of unproductive patriotism. While, therefore, we recognize the part played by each of these great men in the liberation of their country, and while we willingly ignore their differences and disputes, it is Cavour whom we must honor with the title of the Maker of United Italy.

From this digression, which was necessary in order to make the next acts in the drama clear, we now return to the year 1846. Misrule had reached its climax in Rome, and the people were well-nigh maddened, when Gregory XVI. died, and Pius IX. was elected in his stead. It seemed as though an age of gold had dawned; for the greatest of all miracles had happened. The new pope declared himself a liberal, proclaimed a general amnesty to political offenders, and in due course granted a national guard, and began to form a constitution. The Neo-Guelfic school of Gioberti believed that their master's utopia was about to be realized. Italy went wild with joy and demonstrations. The pope's example proved contagious. Constitutions were granted in Tuscany, Piedmont, and Rome in 1847. The duke of Lucca fled, and his domain was joined to Tuscany. Only Austria and Naples declared that their states needed no reforms. On January 2, 1848, a liberal demonstration at Milan served the Austrians for pretext to massacre defenceless persons in the streets. These Milanese victims were hailed as martyrs all over Italy, and funeral ceremonies, partaking of the same patriotic character as the rejoicings of the previous year, kept up the popular agitation. On January 12th Palermo rose against King Ferdinand II., and Naples followed her example on the 27th. The king was forced in February to grant the constitution of 1812, to which his subjects were so ardently attached.

While Italy was thus engaged in making terms with her own sovereigns, the French revolution broke out. Louis Philippe fled to England, and the republic was declared. This altered affairs in Italy, and threw a temporary power into the hands of the Mazzinisti. Sicily pronounced herself independent of the Bourbons, and called the duke of Genoa to the throne. In Naples, the moderate liberal government, of which Poerio had been a member, yielded to a more radical administration

The patriots and the king's troops came to blows, ending in Ferdinand's victory and the remodeling of the constitution. Lombardy rose in insurrection. The Austrians were expelled from Milan, and the governor of Venice capitulated. Provisional republican governments were formed, at Milan under the presidency of Casati, at Venice under that of Daniele Manin. Impelled by the overwhelming enthusiasm which prevailed in Upper Italy, Carlo Alberto declared war on Austria in March. On April 8th he pushed his troops beyond the Mincio; while Piacenza, Parma, Modena, and the Lombardo-Venetian kingdom voted their union to Sardinia by universal suffrage. But the Austrian general, Radetzky, though he lost a battle at Goito, and was forced to witness the capitulation of Peschiera in May, had not given up the game. The pope's troops were established at Vicenza to support the Sardinians. These Radetzky compelled to surrender in June; he then attacked Carlo Alberto's army, who were engaged in the investment of Mantua. A complete victory upon July 25th at Custozza enabled Radetzky to reënter Milan. Carlo Alberto had to retire beyond the Ticino and to beg for an armistice. News of this Austrian victory reached Naples, and gave Ferdinand the heart to quell the Sicilian revolt. On August 30th Messina was bombarded, and such atrocities were perpetrated in the miserable city that the admirals of the French and English fleets had to interfere and extort an armistice from the conquerors. In the meanwhile, affairs had begun to change in Rome. The pope, frightened at the revolution which had already outrun his control, pronounced against the Austrian war and Italian alliance. This roused republican hostility. His minister, the excellent Count Pellegrini Rossi, was murdered in November, and anarchy seemed to threaten the city. Pius escaped in disguise to Gaeta, where he was received by Ferdinand, whom not long before he had denounced as a rogue. From Gaeta he opened the new year, 1849, with a threat of excommunication to his subjects. The Romans were so irritated that the moderate liberal party had to yield to the ultra-radicals; and on February 9th Rome was declared a republic. The government was intrusted to three dictators, of whom Mazzini was the head. Tuscany, meanwhile, had lost her grand-duke. After opening parliament in January with a declaration that he intended to prosecute the war against Austria, he escaped in February on the English war-steamer *Bulldog* to Gaeta. A provisional government was established in Florence, and Mazzini did his best to render Tuscany a part of the new Roman republic. At this epoch two important personages appeared upon the scene—Gino Capponi, who led the moderate liberals, and Urbano Rattazzi, who headed the democratic party. The Florentines were not at bottom out of sympathy with their duke. Therefore they rejected Mazzini's overtures, and recalled Leopold upon the understanding that he would respect their free institutions. Still at Gaeta, the grand-duke mistrusted these advances, begged for Austrian troops, and, when they had arrived, reëntered Tuscany and suppressed the constitution. Such acts of perfidy as these, repeatedly committed by all the petty sovereigns of Italy with the exception of the house of Savoy, forced the people to abandon the theory of federation under existing governments, and to look for their salvation to Piedmont.

This growing confidence in the Sardinian monarchy was not shaken by the disastrous campaign of March, 1849, which baptized the cause of Italian independence with the best blood of Piedmont, gave it a royal martyr, and pledged the dynasty of Savoy to a progressive policy from which it never afterward for a single moment deviated. Pushed by the ultra-radicals, and burning with the purest zeal to liberate Italy, Carlo Alberto took the field again in March, 1849, against the Austrians. On the 24th, after some preliminary movements, proving a want of good generalship and discipline in the Piedmontese army, Radetzky obtained a complete victory at Novara. The king of Sardinia abdicated on the field, in favor of his son, the duke of Savoy, Vittorio Emmanuele II. Carlo Alberto, who had lived through times so troublous and perplexing, who had exposed himself to misunderstanding and misinterpretation, but in whom the devotion to Italy had become a religion, now took refuge at Oporto, where he died, broken-hearted, after a few months of illness. The pathos of this death checked the snarling of discordant parties; and, when the king's body was brought home to be buried on the heights of the Superga, the heart of Italy recognized his worth. Carlo Alberto, though still anathematized by the republican faction, became the saint of Italy. Hundreds of pilgrims flocked to his tomb. The loyalty of his subjects redoubled; and it was felt that, by serving Italy, they would glorify his memory. More than ever, by the disasters of Novara, were the dynasty and aristocracy and people of Sardinia pledged to that national policy which Carlo Alberto's son triumphantly accomplished. In the cottage homes of Piedmont and Lombardy travelers may still behold the old king's agony depicted side by side with the portraits of Cavour and Garibaldi and Vittorio Emmanuele.

The intrigues of which Gaeta had been a center provoked a crusade of the Catholic powers against republican and anti-papal Rome. A French expedition, under General Oudinot, landed at Civita Vecchia on April 25th, and on the 29th reached the walls of the city. The Neapolitan army took up a position at the base of the Alban hills. Spaniards arrived at Fiumicino, and Austrians entered the Legations. The French professed to come as friends, but the triumvirs of the Roman republic refused them entrance, and General Oudinot established his camp on the Janiculan. Garibaldi, who was guarding the frontier of the Abruzzi, returned and defeated the Neapolitans at Palestrina on May 11th. Still his assistance did not suffice to avert the French attack, and on July 2, after a siege of four weeks, the city capitulated. Mazzini and Garibaldi made good their escape. The French troops entered and held Rome for the pope. It was not until April, 1850, however, that Pius IX. ventured to return. When he arrived in his capital, he began the reactionary reign, supported by his French garrison and Jesuit advisers, which only ended with the semi-forcible entry of the Italians in 1870.

With the fall of Rome the hopes of the revolutionary party ended. Austrian troops replaced their ducal puppets in Parma, Modena and Tuscany. King Ferdinand, rightly now named Bomba, terrorized his subjects into silence by the aid of Swiss mercenaries, artillery and dungeons too loathsome to be described. Only Venice still held out, blockaded in the Adriatic and bombarded from the land, through all the horrors of famine, conflagration and cholera, until the month of August. Few episodes in the history of that noble city are more glorious than this last desperate and patient struggle; and few names upon her muster-roll of heroes are equally illustrious with that of the lion-hearted and blameless Daniele Manin.

In the disastrous year 1849 it seemed as though the fate of Italy was sealed. The republicans had done their best and failed at Milan, Rome, and Venice. The power of Piedmont was broken at Novara. And yet we have good cause to say that the miseries of this epoch wrought the future salvation of the race. The former vain trust in the Italian sentiment of petty courts, the Neo-Guelfic mysticism of Gioberti's party, the utopian confidence in papal liberalism, the vague schemes of confederation which had assumed many visionary forms, were all dissipated forever. To rightly thinking men it became clear that the regeneration of Italy must be intrusted to Piedmont. When Vittorio Emmanuele entered Turin in silence after Novara, with a demoralized army and a ruined exchequer, the spirit of his people was cast down, but not extinguished. They had assumed responsibility, and were not going to abandon it. "The house of Savoy cannot retreat" became the watchword of the throne. D'Azeglio's *Nous recommencerons* expressed the determination of the ruling classes. It is true that at this crisis they had to combat the hostility and bitter jealousy of the republicans. Mazzini's party stirred up Genoa to revolution, and La Marmora received the ignoble task of restoring that intractable city to a sense of duty. "Better Italy enslaved than delivered over to the son of the traitor Carlo Alberto," exclaimed the prophet of democracy, whom no reverses could persuade that in such politics as those of Italy the half is better than the whole. But Mazzini was no longer a power of the first magnitude. The work which he had done for Italy was solid and abiding. Still he had failed to carry the bulk of the nation with him. Men of more sober aspirations saw that to aim at national independence and European reconstruction at one leap was utopian. Italy must first be made; and the only power capable of calling her into existence was Piedmont, still free and puissant among a crowd of feeble and anarchical despotisms. The experience of 1849 proved that the armies of Piedmont, in the hour of need, could rely on volunteers of pith and nerve, in cities so downtrodden even as were Rome and Venice; for it must not be forgotten that the republicans who sustained both sieges were members of the bourgeoisie and proletariate. This consolidation of opinion after the events of 1849 was proved by Gioberti's recantation of his earlier mysticism. In 1851 he published a new treatise *Rinnovamento*, which distinctly indicated Piedmont as the substantial basis of Italian independence. Daniele Manin, now an exile in Paris, declared his adhesion to the same doctrine. The constitutional party was further strengthened by the adhesion of the leading republicans, Pallavicino and La Farina; and in 1857 the main point of unanimity was secured by the formation of the *Società Nazionale*, which kept sectarian jealousies in the background. Garibaldi, at this time less republican than he afterward became, was himself a president of this political association. Henceforward the genuine Mazzinisti formed a permanent minority. They could do little more than to impede without perplexing or baffling the policy of the Piedmontese statesmen, who felt themselves to be supported by the instincts of the race at large.

Vittorio Emmanuele began his reign with Massino d'Azeglio for minister. He steadily refused all Austrian advances, though enforced by his own wife and mother, both of whom were Austrian archduchesses. The house of Savoy had pledged itself to Italy, and the house had never broken faith. The first cares of the new ministry were devoted to internal reforms, to the organization of the army by La Marmora, and to financial measures. In 1850 they passed the so-called Siccardi law, which abolished ecclesiastical courts. This was followed by a law of civil marriage; and in 1854 the ecclesiastical reforms were completed by Rattazzi's bill for restricting religious corporations and placing church property under state control. The necessity of these measures is demonstrated by the fact that the little kingdom of Sardinia counted forty-one bishops, 1,417 canonries, about 18,000 persons vowed to a monastic life, and one ecclesiastic to every 214 inhabitants. Their importance will be understood when we reflect that these laws were extended to Italy after the union.

Meanwhile Cavour had joined the government in 1850, as minister of commerce. Not least among his great qualities was a thorough understanding of parlimentary tactics; and, though his first attempts at public speaking were unsuccessful, he soon remedied this defect. Mastery of facts and moral force gave weight to his eloquence far above rhetoric. Meanwhile his study of English politics and admiration for men like Pitt and Peel developed what in him was an innate instinct for parliamentary leadership. This sound sense of the conditions of representative government induced him to form a coalition with Rattazzi, the leader of the democrats, in 1852. D'Azeglio and the king were frightened by so bold a step. But Cavour's preponderance in the chambers was irrestible; and in November, 1853, he superseded D'Azeglio as prime minister. From this date the fortunes of Italy were in his hands, and Cavour became one of the foremost men in Europe. It was by his advice that the Sardinian troops under General La Marmora took part with France and England in the Crimean war, where they distinguished themselves in the battle of the Tchernaya. The nation by this step secured powerful allies, forced itself upon the notice of Europe, and accustomed its army to service on a grand scale. At the congress of Paris in 1856 Cavour represented Sardinia, and laid the grievances of Italy before the allied powers. Both France and England remonstrated, but vainly, with Ferdinand II. for his misgovernment.

Cavour had traveled both in England and France, and had observed that, though the English sympathized with Italy and were horrified by what they heard of Neapolitan atrocities, he was not likely to get more than moral support and non-interference from Great Britain. Yet he could not work Italian independence without the help of one of the great powers against Austria. He therefore determined to rely on Louis Napoleon Bonaparte, who had expressed his willingness to afford substantial assistance at the proper moment. Between the years 1856 and 1859 it was Cavour's one endeavor to maintain the French emperor in this resolve, and at the same time to drive the Austrians into a seasonable declaration of war.

The situation was delicate and dangerous in the extreme; and in January, 1858, the minister's combinations were seriously imperiled by Felice Orsini's attempt on Napoleon's life. It was only by passing a bill which defined the crime of political assassination that he regained the emperor's confidence. Later in the year, Cavour met Napoleon at Plombières, where the preliminaries to a Franco-Italian alliance for war against Austria were settled.

The cabinet of Vienna, harassed by repeated memorials on the subject of their tyranny in Lombardy, complained to Europe that Piedmont was a standing menace to Italian peace, withdrew its minister from Turin, and demanded the disarmament of the Sardinian kingdom. Louis Napoleon now prepared himself for war. On January 1, 1859, Vittorio Emmanuele opened parliament with a speech which declared the coming struggle: "We are not insensible to the cry of suffering that rises to us from so many parts of Italy." The words *Grido di dolore* were understood to be the watchword of the war. In the early summer of 1859 the French crossed the Alps. The puppets of Parma, Tuscany, and Modena fled, as usual, before the gathering storm—this time never to return. The battles of Magenta (June 4th) and Solferino (June 24th) opened

Lombardy to the French and Sardinian troops, as far as the Quadrilateral of fortresses protecting Venice. There Louis Napoleon sheathed his sword. He met the emperor Francis Joseph at Villa Franca, and, without consulting his allies, agreed to an armistice. At Plombières he had declared that he meant to free Italy from the Alps to the Adriatic. But now he agreed upon the Mincio as the future boundary between Sardinia and Austria. Venice was not to be liberated. Terrible was the disappointment of the Piedmontese, who had made vast sacrifices for this campaign, and who felt that their king had been insulted. Yet Louis Napoleon was incapable of more. He knew himself to be no general, and he had good reason to be certain that, if he pushed Austria too far, Prussia would take up arms and carry war to France upon the Rhine. Moreover, the gain to Italy proved greater than at first appeared. Tuscany, Modena, Parma, and Romagna declared their determination to join the kingdom. In March, 1860, the annexation of Central Italy to Sardinia was effected, and approved by the French emperor. It now appeared that, according to a hitherto secret understanding with Cavour, Louis Napoleon was to take Savoy and Nice as the price of his assistance. This sacrifice of their ancient home, the cradle of their dynasty, the house of Savoy made to the Italian cause. But it was long before the Italians forgave Cavour. He had to bear reproaches from all quarters, especially from Garibaldi, who was never tired of repeating, "That man has made me a foreigner in my own house."

The same month which witnessed the annexation of Central Italy saw the outburst of a revolution in the south. Bomba was dead; but his son, Francis II., by continued acts of cruelty to state prisoners, and by cowardly oppression of his subjects, had merited the nickname of Bombino. Refugees from Naples spread the tale of Bourbon tyranny all over Europe. Even London trembled with rage at Poerio's sufferings. The insurrection broke out at Palermo, Messina, and Catania. Garibaldi determined to support it. On May 5th he set out from Genoa with his volunteers, the famous Mille, each of whom became for Italy a hero. Cavour knew of the expedition and secretly favored it, though he openly expressed the regret of the Sardinian Government to Europe. It was his policy to wait and see what happened, trusting that the gain of the venture would accrue to the new kingdom. Garibaldi landed at Marsala, and proclaimed himself dictator in the name of Vittorio Emmanuele, king of Italy. The conquest of Sicily was the matter of a few days. In August the general crossed to Spartivento, defeated the royal army, drove Francis II. to Gaeta, and entered Naples on September 7th. There Mazzini joined him, and the difficulties of the situation began to disclose themselves. Garibaldi had no capacity for administration; yet he was unwilling to resign his dictatorship. He had proclaimed Vittorio Emmanuele; yet he lent an ear to the republicans, who hated Piedmont. Moreover, he hardly concealed his intention of marching on Rome. Had he taken this step, success would have involved reactionary interference on the part of Europe, while failure might have involved the loss of Lower Italy. Meanwhile the natives of the Two Sicilies were slow to accept annexation. They dispensed with the Bourbons gladly; but they were ready to fulfill the prophecy of Bomba, that "whosoever turned the Bourbons out would have enough to do in Lower Italy for the next century." Anarchy began to reign, and the Bourbon party lifted up its head again at Gaeta. In these circumstances, Cavour, after ascertaining that he had the sanction of Napoleon, resolved on sending troops into the papal states. This seemed the only means of preventing Garibaldi's march on Rome, and securing his acquisitions for United Italy. General Cialdini accordingly occupied Urbino and Perugia, defeated the pope's general Lamoricière, at Castelfidardo, joined Garibaldi, and helped him to gain a victory over the Bourbon troops on the Volturno. On October 2d Cavour defined the situation for the parliament at Turin: "Garibaldi wishes to perpetuate the revolution; we wish to terminate it." Soon after this, Vittorio Emmanuele himself entered the Abruzzi. Garibaldi, with the loyalty which never deserted him, resigned his dictatorship, and returned to Caprera. In November Cavour was able to write to Berlin: "We are Italy; we work in her name; but at the same time it is our policy to moderate the national movement and maintain the monarchical principle."

In February, 1861, Gaeta fell, after a resistance ennobled by the courage of Francesco's German consort. The kingdom was annexed by plebiscite, and Vittorio Emmanuele was proclaimed king of Italy at Turin. Europe tacitly assented to Italian independence. Only Rome and Venice now remained to be liberated. The difficulties under which new Italy labored were enormously increased by the annexation of the Two Sicilies. Ever since the Norman Conquest they had formed a province apart. Temperament, custom and tradition separated the inhabitants, as far as it was possible, from the sober people of the north. The national parliament had to contend with brigandage encouraged by the clergy, with deeply-rooted antipathies of race, with the discontent of disbanded officials, and with the multitudinous obstacles which a demoralized society offers to strict government. Upper Italy alone was educated for political existence. Elsewhere the bad government of centuries had made the people permanently hostile to the state, while corruption rendered them untrustworthy as agents. Therefore the business of the country had to be conducted by the Piedmontese. Yet this important fact was neglected in the composition of the parliament, where a due preponderance had not been secured for the colleges of Northern Italy. It was impossible not to own that the work of emancipation and annexation had progressed too quickly. To add to the difficulty, Italy lost her greatest statesman at this juncture. On June 5, 1861, Cavour died with the words "A free church in a free state" upon his lips. The last months of his life had been given to planning the peaceable acquisition of Rome by treaty with the pope and Louis Napoleon.

What remains of Italian history between 1861 and 1870 may be briefly told. Ricasoli formed a conservative government after Cavour's death, and Rattazzi led the opposition. Garibaldi, who vowed never to rest till Rome and Venice had been liberated, headed the party of action. In 1862 he raised a volunteer army and invaded Sicily. Louis Napoleon regarded this as a menace to Rome, and ordered Rattazzi, who was now in power, to check his progress. Cialdini marched to Reggio, where the royal troops were defeated by the volunteers on September 28, 1862. Next day Garibaldi was attacked and beaten at Aspromonte by General Pallavicini. He retired, wounded, to Caprera, whence he published his defense. The blame was seen to lie with Rattazzi, who had thought to follow Cavour's policy of masterly inaction without first settling with France. The sympathy of Europe with Italy was so great after this disaster that in September, 1864, Louis Napoleon agreed to a gradual withdrawal of French troops from Rome, provided Italy respected what remained of the pope's temporal power. By the same convention Florence became the capital. This was a good step in advance toward the annexation of Rome

In 1866 the Austro-Prussian war gave a new opportunity to the Italians. They entered into alliance with Prussia, and marched an army across the Mincio. The defeats of Custozza, Monte Suello, and Lissa deprived the Italian troops of any claim to military or naval glory in this war. But the Prussian victory of Königgratz secured the main objects for which they fought. Venice, with the Quadrilateral, was joined to the Italian kingdom, while Austria kept her Istrian and Dalmatian provinces.

In accordance with the September convention, Louis Napoleon withdrew his garrison from Rome in 1866. This event inflamed the party of action. Mazzini called upon the people to seize the Eternal City; and Garibaldi in 1867 declared his resolve to take Rome or die. Rattazzi, who was again in power, once more attempted the policy which had failed him in 1862. He ignored the obligation which bound Vittorio Emmanuele to defend the papal frontiers, and he hoped that France would tolerate a volunteer invasion. He was mistaken. Louis Napoleon interfered, and the Italian cabinet was forced to discountenance the further proceedings of the volunteers. Disturbances occurred in Rome, and Garibaldi gained a victory at Monte Rotondo. Meanwhile the king appealed to the Italians to preserve his honor, and the emperor sent a new garrison to Rome. Garibaldi's volunteers surrendered at Mentana, on the 4th of November, to the French and papal troops; and, while the general was retiring to Caprera, he was arrested by order of the Italian Government at Figline. But the end was now not distant.

When the victory of Sedan overthrew the French empire in September, 1870, Jules Favre declared the September convention to be at an end; Vittorio Emmanuele was released from his obligations, and on the 20th he entered Rome, which now became his capital. Pius IX. was allowed to retain the Vatican with its dependencies, the church of Sta. Maria Maggiore, and Castel Gandolfo on the Alban hill. The state voted him a munificent income, and he was left in peace to play the part of a persecuted prisoner. Thus ended the emancipation of Italy; nor did the events of the following ten years alter the situation created by the king's occupation of Rome in 1870. Vittorio Emmanuele died and was succeeded by his son Umberto in 1878. The latter was assassinated at Monzo in July, 1900, and was succeeded by Victor Emmanuel III. The pope Pius IX. died in 1878, and was succeeded by Leo XIII.

LANGUAGE.

The Italian language is the language of culture in the whole of the present kingdom of Italy, in some parts of Switzerland (the canton of Ticino, and part of the Grisons), in some parts of the Austrian territory (the districts of Trent and Görz, Istria, along with Trieste, and the Dalmatian coast), and in the islands of Corsica and Malta. In the Ionian Islands, likewise, in the maritime cities of the Levant, in Egypt, and more particularly in Tunis, this literary language is extensively maintained through the numerous Italian colonies and the ancient traditions of trade.

The Italian language has its native seat and living source in Middle Italy, or, more precisely, Tuscany, and, indeed, Florence. For real linguistic unity is far from existing in Italy; in some respects the variety is less, in others more observable than in other countries which equally boast a political and literary unity. Thus, for example, Italy affords no linguistic contrast so violent as that presented by Great Britain, with its English dialects alongside of the Celtic dialects of Ireland, Scotland, and Wales, or by France, with the French dialects alongside of the Celtic dialects of Brittany, not to speak of the Basque of the Pyrenees and other heterogeneous elements. The presence of not a few Slavs stretching into the district of Udine (Friuli), of Albanian, Greek, and Slav settlers in the southern provinces, with the Catalans, of Alghero (Sardinia), a few Germans at Monte Rosa, and a remnant or two of other comparatively modern immigrations, is not sufficient to produce any such strong contrast in the conditions of the national speech. But, on the other hand, the Neo-Latin dialects which live on side by side in Italy differ from each other much more markedly than, for example, the English dialects or the Spanish; and it must be added that, in Upper Italy, especially, the familiar use of the dialects is tenaciously retained even by the most cultivated classes of the population.

ITHACA (Ἰθάκη), vulgarly Thiaki (Θιάκη), is, next to Pasco, the smallest of the seven Ionian Islands, with an area of about forty-four square miles. It forms an eparchy of the nomos of Cephalonia in the kingdom of Greece, and its population, which was 9,873 in 1870, is given by the census of 1900 at 15,222, of whom 6,305 were males. The island consists of two mountain masses, connected by a narrow isthmus of hills, and separated by a wide inlet of the sea known as the Gulf of Molo. Vathy, the chief town and port of the island, lies at the northern foot of Mount Stephanos, its whitewashed houses stretching for about a mile around the deep bay in the Gulf of Molo, to which it owes its name. As there are only one or two small stretches of arable land in Ithaca, the inhabitants are dependent on commerce for their grain supply; and olive oil, wine, and currants are the principal products obtained by the cultivation of the thin stratum of soil that covers the calcareous rocks.

ITHACA, the chief town of Tompkins county, N. Y., is prettily situated in a township of the same name on the Cayuga Inlet, one and a half miles from the southern end of Lake Cayuga, and 142 miles west by south of Albany. It is at the junction of several railways, has gas and water works, and carries on some commerce, of which the shipping of coal from the Pennsylvania anthracite district forms an important constituent. The manufactures include agricultural implements, paper, glass, leather, and machinery. On an eminence to the northeast rise the handsome buildings of Cornell university, chartered in 1865 and opened in 1868, in which a marked characteristic is the prominence given to the study of agriculture and the mechanical arts. Sage College was presented to the university by the Hon. H. W. Sage, on condition that women should have the same advantages for education as men. The public library of Ithaca was built and stocked at a cost of $65,000 by the same munificent citizen whose endowment of the university is commemorated in its name. The neighborhood of Ithaca is remarkable for the number of its waterfalls, of which Ithaca Fall, 160 feet high by 150 feet broad, is the chief. The population of the town in 1900 was 13,136.

ITINERARIUM. This Latin word, equivalent to road-book, is more particularly employed to designate the descriptions still extant of the ancient Roman roads and routes of traffic, with the stations and distances.

ITIUS PORTUS, a place of no importance in itself, has a kind of factitious interest as the point whence Julius Cæsar sailed from Gaul to Britain. Although Cæsar does not mention the Portus in speaking of his first expedition (55 B.C.), his language in describing it as the naval rendezvous before his second invasion (54 B.C.) leaves little doubt that he had sailed from it before. To determine, therefore, the site of the Portus Itius, while it would decide one of the most vexed questions of either ancient or modern geography, would go far to fix the spot where the great captain first set foot in England.

ITURBIDE, or YTURBIDE, AUGUSTIN DE, emperor of Mexico from May, 1822, to March, 1823, was born September 27, 1783, at Valladolid, now Morelia, in Mexico. Hailed by the soldiers as emperor Augustin I. on May 18, 1822, he was compelled within ten months, by his arrogant neglect of constitutional restraints, to tender his abdication to a congress which he had forcibly dissolved. Although the congress refused to accept his abdication on the ground that to do so would be to recognize the validity of his election, it permitted the ex-emperor to retire to Leghorn in Italy, while in consideration of his previous services a yearly pension of £5,000 was conferred upon him. But Iturbide resolved to make one more bid for power; and in 1824, passing from Leghorn to London, he published a *Statement*, and on May 11th set sail for Mexico. The congress immediately issued an act of outlawry against him, forbidding him to set foot on Mexican soil on pain of death. Ignorant of this, the ex-emperor landed in disguise at Soto la Marina on July 14th. He was almost immediately recognized and arrested, and on July 19, 1824, was shot at Padilla, by order of the State of Tamaulipas, without being permitted an appeal to the general congress.

ITZEHOE, one of the busiest commercial towns of northern Germany, is situated on the Stör, a navigable tributary of the Elbe, in the circle of Steinburg of the Prussian province of Schleswig-Holstein, thirty-two miles northwest of Hamburg, and fifteen miles north of Glückstadt.

IVAN (or JOANN, *i.e.*, JOHN) I., grand-duke of Moscow from 1328 to 1340, was surnamed Kalita in allusion to the "purse" which he always carried at his girdle. The great importance of Ivan in Russian history is that he was the consolidator of the power of Moscow, the nucleus out of which the empire was to be formed at a future period.

IVAN II., grand-duke from 1353 to 1359, son of Ivan I., succeeded on the death of his brother Simon Gordi, or the Proud.

IVAN III., surnamed the Great, grand-duke from 1462 to 1505, forms one of the most important figures in the annals of Russia, for to him is due the consolidation of the autocracy. His long reign of forty-three years was very beneficial to his country. He was a skillful diplomatist, and often brought about by intrigue what others could only effect by force of arms.

IVAN IV., surnamed the Terrible, the first czar of Russia, was a mere child at the time of the death of his father Vasili in 1533. His reign may be divided into three periods—(1) his minority under the regency of his stepmother Helen Glinska; (2) from his attaining his majority till the death of his amiable wife Anastasia Romanova, during which time he was a bold and vigorous ruler, and careful of the happiness of his subjects; and (3) from her death till the conclusion of his reign in 1584, the period signalized by those atrocities which have earned for Ivan such an unenviable reputation. He was the first Russian sovereign who took the title of Czar, a Slavonic form of Cæsar. Siberia was also annexed in this reign through the enterprise of the Cossack Yermak, and the English first opened up commercial intercourse with the country by means of the expedition of Sir Hugh Willoughby and Richard Chancellor in 1553. The atrocities committed by Ivan at Novgorod in 1569, and at Pskov soon afterward, are well known. The miserable tyrant expired in 1584, from grief for his son, whom he had killed in a fit of passion three years before.

IVAN V., czar from 1682 to 1696, was the son of Alexis by his first wife Maria Miloslavskaia. He was infirm both in mind and body

IVAN VI., czar in 1740–41, was son of Anthony Ulrich, of Brunswick, by his marriage with Anne, granddaughter of Ivan V. The reign of this unfortunate young man lasted but a year, under the regencies of his mother and Biren. Owing to the success of the revolution under Elizabeth, daughter of Peter the Great, he was confined as a prisoner in Shlüsselburg, and Anthony and Anne with their other children were banished to Kholmogorî in the government of Archangel. By long detention in the fortress Ivan became, it is said, half-witted. In the year 1764 a certain Lieutenant Mirovich attempted to deliver him from captivity and proclaim him emperor. Ivan, however, was slain in the skirmish that ensued, and Mirovich was afterward publicly executed. According to some, he had been urged to the act by Catherine, who wanted an excuse for putting Ivan to death.

IVANOVO, or IVANOVO-VOZNESENSK, the "Manchester of Russia," a town in the government of Vladimir, twenty miles northwest of Shua, near the river Uvod, and on the road from Shua to Nerakhta. It consists, as the full name implies, of what were originally two villages—Ivanovo, which existed at least as early as the sixteenth century, and Voznesensk, of much more recent date—united into a town in 1861. Pop. (1898), 53,949.

IVORY is essentially equivalent to dentine, that hard substance, not wholly unlike bone, of which most teeth principally consist. By usage, however, its application has become almost restricted to the dentine of those teeth which are large enough to be available for industrial purposes, viz., the tusks of the elephant, the hippopotamus, the walrus, the narwhal and the sperm whales.

The tusks of the elephant are a pair of upper incisor teeth, which may attain to an enormous development. The largest teeth were possessed by the extinct mammoths, of which tusks have been found in Siberia twelve feet and more in length, and weighing 200 pounds each. Among recent elephants the African species possess the largest tusks, these attaining to a length of nine or ten feet and a weight of 160 pounds each, while the tusk of an Indian elephant which measured eight feet in length and weighed ninety pounds has been placed on record as exceptionally large. In Africa both males and females are furnished with large tusks; but in the Indian species a sexual difference exists, the tusks of the female projecting only a few inches from the gums, while even of the males by no means all are "tuskers." Tusks are often broken by fighting, and always show marks of considerable wear, while even captive elephants, with their shortened tusks, make great use of them for a variety of purposes; for example, an elephant will, when set to pull at a rope, take it between his molar teeth and pass it over one of his tusks to get a good purchase. Nothing but an extremely strong and elastic material such as ivory is could withstand the the strains to which it is constantly exposed.

Captive elephants have their tusks shortened, and the ends bound with metal to prevent their splitting; and, as the tusk is continually growing by the conversion of fresh proportions of vascular pulp into ivory, the operation has to be repeated. When this is done at intervals of ten years, the segment cut off is valuable, and is sold as ivory; some prefer, however, to cut the tusks much more frequently. But under no circumstances is the ivory from domesticated elephants so highly esteemed as that from the wild animal.

The best ivory is the African, and the first quality of that comes from near the equator; much is brought down by natives by land from the interior, while in other districts expeditions are organized by Europeans to go into the interior and collect the stores gathered by native tribes. The price of ivory varies much in different districts, being generally higher on the west than on the east coast; the transaction is generally one of barter, and the price therefore difficult to estimate. The tusks are sold by weight, and stones and iron are sometimes thrust down into the hollow pulp cavity to increase the weight, so that dealers generally feel down the hollow with an iron rod to detect foreign matter. The value of the ivory depends upon the size of the tusks; those below six or seven pounds' weight are not worth more than half the price per pound of really fine tusks. Something depends on the care bestowed upon the tusks, which are sometimes roughly treated, while others are waxed and carefully wrapped up for protection. The African ivory trade is an ancient one, and in mediæval times Marco Polo speaks of the traffic in ivory at Zanzibar as being astonishing in its amount.

The tusks of the mammoth from northern Siberia are said to furnish almost the whole of the ivory used by Russian ivory workers. They are found in most extraordinary abundance, and it is said that from the time of Doctor Breyne's quaint paper "*Behemoth*" in the *Philosopical Transactions* for 1737 till now there has been no intermission in the supply. They come principally from the neighborhood of the Lena and other great rivers discharging themselves into the Arctic Ocean, and are abundantly found in the Liakhoff Islands. Mammoth tusks are slenderer, much more curved, and in proportion to the size of the animal much larger than those of recent elephants.

The finest quality of ivory from equatorial Africa is closer in the grain, and has less tendency to become yellow by exposure than Indian ivory. When first cut it is semi-transparent and of a warm color; in this state it is called "green" ivory, and as it dries it becomes much lighter in color and more opaque. This is supposed to be the result of the drying out of the "oil;" but ivory contains less than one-half per cent. of fatty material, and that which dries out is water, not oil. During this drying process the ivory shrinks considerably, so that it is necessary to season it like wood when such things as box lids, which need to fit, are to be made from it. The tusks shrink much more in their width than in their length, which will be readily understood when the many concentric rings of interglobular spaces, containing soft material, which dries up and leaves them empty, are remembered. It is on account of this peculiarity of structure that billiard balls are turned from tusks not greatly exceeding them in diameter, for by the selection of such tusks the ivory on the opposite sides of the ball will correspond in density and in structure, and the shrinkage will be uniform about its center. They are usually turned roughly into shape, kept for some time in a warm room to shrink, and then turned true. The thin plates cut for piano keys are dried and shrunk at once by being baked for a time in an oven, but after being dried they are still subject to changes in bulk in a moist atmosphere.

Great care is taken by ivory cutters to cut up the tusk to the greatest advantage, its high price necessitating the strictest economy in its use. With age ivory turns yellow, and various receipts are given for restoring its whiteness; but they mainly depend upon mere removal of the outer surface, and no satisfactory method of bleaching it is known; it preserves its color best when exposed to light. Considering the high percentage of organic matter which it contains, it is surprisingly durable.

Ivory takes a variety of dyes well, without interfering with the polish of its surface; the actual matrix is stained, and the color is not merely due to the penetration of pigment into the open dentinal tubes.

The great canine teeth of the hippopotamus furnish an ivory which is harder and whiter than that of the elephant, and less prone to turn yellow; these differences are probably due to its containing a smaller percentage of organic matter. It also lacks the engine-turning pattern of elephant ivory. The tusk of the hippopotamus is a tooth of persistent growth, strongly curved into a segment of a circle, and solid in the greater part of its length. It is thickly coated with enamel on its exterior surface, and is trihedral.

Among the northern nations the tusks of the walrus have long been used as a source of ivory. The great upper canines consist of a body of dentine invested with cementum; they are oval in section, solid, and their axis is made up of secondary dentine, which is far larger in amount than in the hippopotamus, and makes up a considerable part of the whole tooth. This is very nodular in appearance when cut and polished, but is of dense and tolerably uniform consistence.

The spirally twisted tusk of the narwhal, the teeth of the sperm whales, the ear-bones of whales, and the molar teeth of the elephant, are also all made use of as sources of ivory, though they are far less valuable than the larger tusks. For the subject of carving in ivory, see CARVING. The earliest piece of ivory work known is a rude incised drawing of a mammoth upon a fragment of mammoth tusk, which must have been executed by a contemporary of the animal. Numerous references to ivory occur in the Old Testament, which show that it was regarded as of great value.

From the earliest times down to the present day there has been a constant succession of ivory workers, though in mediæval times artists of higher ability were to be found than any who will now devote themselves to such work.

Among the chryselephantine statues of ancient Greece executed by Phidias, Praxiteles, and others, one of Minerva in the Parthenon was forty feet in height, and was constructed of ivory and gold; others are mentioned as made of wood, with face, hands and feet of ivory. Yet in some cases it is expressly said that the statue was entirely of ivory, special exception being made of a portion of the dress which was not.

In former times ivory was frequently used for the manufacture of artificial teeth; but this has become a thing of the past, ivory having been superseded by more durable and more manageable materials.

The principal demand for ivory beyond the purposes already alluded to arises in connection with the cutlery trade, very large quantities of it being used for the handles of pocket and table knives. It is also extensively employed for the handles of walking sticks and umbrellas, for combs, paper knives, and ladies' fans, and for measuring rules and mathematical scales. Further, it is in considerable demand for the manufacture of chess and draughts men, for statuettes, relievo plaques, caskets, and many minor objects of furniture, decoration, and ornament, and for the purposes of inlaying. Dieppe is now a principal center of the European ivory manufacture.

But it is in the East, and especially in China, that ivory is now most highly prized and most elaborately worked into decorative forms. No amount of patience and care appears to be considered excessive among the Chinese for the decorative working of ivory, as is obvious in the extremely minute and delicate workmanship in their lace-like carved open-work trays, while their carved nests of concentric ivory balls are still reckoned among the puzzles of industry. By the Japanese ivory is equally held in esteem, and is decoratively treated in their peculiar manner in the form of spill cases, medicine boxes, and the elaborately carved and ornamented nitsuké or large buttons. In India ivory is extensively used in the inlaid work of Bombay, etc., and for furniture decoration generally; and it is also cut into long, slender filaments for making the tails of state chowries or fly-flappers, which, both handle and tail, are in many instances made of ivory.

All ivory dust, chips, and pieces unsuited for working are utilized by being converted into gelatine, which they may be made to yield by prolonged boiling, or by being calcined into ivory black. Confectioners are said to make use of ivory dust as a basis for soups, and it forms an excellent colorless size, employed for delicate purposes. When ivory is calcined in a close chamber, in which there is not enough oxygen to burn the carbon into carbonic acid, the organic matrix is burnt into carbon, with which remain in the most intimate admixture the lime and magnesium salts which had previously hardened it. Strange to say, the calcined ivory retains its form and texture notwithstanding the destruction of the organic matrix, and specimens sometimes show the engine-turning markings on the cut surface with the utmost distinctness. It is an animal charcoal of great purity, and owes its delicacy and particular properties to the extremely fine division of the carbon particles. When ground up and mixed with appropriate media, it affords both to the oil and the water-color painter a most valuable black pigment; it is also used as an ingredient in the fine printing ink used for engravings and etchings.

Attempts have been made to manufacture an artificial ivory, but with no very satisfactory result. Billiard balls and other small objects have been manufactured of celluloid, a combination of gun cotton and camphor with ivory dust, which becomes plastic at a temperature of about 280°, and when cold is again quite hard and somewhat translucent.

IVORY, Vegetable. The plant yielding the vegetable ivory of commerce is known to botanists as *Phytelephas macrocarpa*, Ruiz and Pavon. It is a native of South America, occurring chiefly on the banks of the river Magdalena, Colombia, always found in damp localities, not only, however, on the lower coast region, as in Darien, but also at a considerable elevation above the sea. It is mostly found in separate groves, not mixed with other trees or shrubs, and where travelers tell us even herbs are rarely met with, "the ground appearing as if it had been swept." The plant is severally known as the "Tagua" by the Indians on the banks of the Magdalena, as the "Anta" on the coast of Darien, and as the "Pullipunta" and "Homero" in Peru.

IVORY, James, a Scottish mathematician, was born in Dundee in 1765, and died in 1842.

IVORY COAST, that part of the West African seaboard which lies between the Grain Coast (now almost all belonging to Liberia) and the Gold Coast, or between Cape Palmas on the west and the Assini river on the east.

IVREA, the ancient *Eporedia*, a town of northern Italy, capital of a district of the same name, is situated at the foot of the Alps on an eminence at the southern extremity of the beautiful and luxurious Val d' Aosta, near the river Dora Baltea, and at the termination of a branch railway line from Chivasso, twenty-nine miles north-northeast of Turin.

IVRY-SUR-SEINE, a town and commune of France, in the arrondissement of Sceaux and the department of Seine, is situated near the left bank of the river Seine, four miles southeast of Paris.

IVY is the collective designation of certain species and varieties of *Hedera*, the important alliances of which are *Aralia* and *Panax*, which, with some twenty other less-known genera, constitute the natural order *Araliaceæ*. There are fifty species of ivy recorded in modern books, but they may be reduced to three. The European ivy is the *Hedera Helix*, of Linnæus, a plant subject to infinite variety in the forms and colors of its leaves, but the tendency of which is always to a three-lobed form when climbing, and a regular ovate form of leaf when producing fruit. The African ivy is *H. canariensis*, Willd., otherwise known as the Irish ivy, a native of Africa and the adjacent islands. This also varies, but in a less degree than *H. Helix*, from which its leaves differ in their larger size, rich deep green color, and a prevailing tendency to a five-lobed outline. When in fruit the leaves are usually three-lobed, but they are sometimes entire and broadly ovate. The Asiatic ivy is *H. colchica*, Koch, otherwise known as *H. rægneriana* and *H. ragusina*. This has ovate, obscurely three-lobed leaves, of a coriaceous texture, and a deep green color; in the tree or fruiting form the leaves are narrower than in the climbing form, and without any trace of lobes. Distinctive characters are also to be found in the appendages of the pedicels and calyx, *H. Helix*, having six-rayed stellate hairs; *H. canariensis*, fifteen-rayed hairs, and *H. colchica*, yellowish two-lobed scales.

The ivy is a scarce plant on the American continent. In the northern United States and British America the winters are not more severe than the ivy can endure, but the summers are too hot and dry, and the requirements of the plant have not often obtained attention. In districts where native ferns abound the ivy will be found to thrive, and the varieties of *Hedera Helix* should have the preference. But in the drier districts ivies might often be planted on the north side of buildings, and, if encouraged with water and careful training for three or four years, would then grow rapidly and train themselves. A strong light is detrimental to the growth of ivy, but this enhances its value, for we have no hardy plants that may be compared with it for variety and beauty that will endure shade with equal patience.

IXION, a hero of Thessalian legend, was king of Gyrton. As a punishment for the murder of his father-in-law, Deioneus, madness came upon him, until Zeus purified him of his crime and received him as a guest in Olympus. Æschylus uses him as the type of a guilt-laden mortal purified and pardoned by divine grace, and the mythical representative of all later penitents. Ixion abused his pardon by trying to seduce Hera; but the goddess substituted for herself a cloud, by which he became the father of the Centaurs. Zeus bound him on a fiery wheel, which rolls unceasingly through the air. The wheel is one of the commonest symbols of the sun, and Ixion is clearly the sun-god, and a form of Zeus. His wife, Dia, is, as her name shows, the consort of Zeus, and her son, Pirithous, is called son of Zeus as well as of Ixion. Nephele, the cloud, occurs also as wife of Zeus-Athamas, as here of Zeus-Ixion.

J.

J This letter is a modified I. If we consider its place in the alphabet immediately after I, and the corresponding position of V and W after U, we are naturally led to conclude that the new letter was intentionally formed by someone who wished to have a special symbol to denote the palatal consonant *y*, into which *i* readily passes, just as *w* denotes the labial consonant into which *u* passes. For the symbol is a new one. It is not found in the Latin alphabet, in which I was employed alike for the vowel and consonant—though sometimes the I was doubled for the consonant. So far, however, as we can see, J in its origin was nothing but a fancy of the scribes. In fifteenth century English MSS. the *i*-symbol was drawn a little below the line to denote J, and by degrees this was curled slightly to the left. Again in writing numbers such as vii, viii, it was usual to write uij, uiij, etc. This was imitated in early printing, and hence arose *j*, the earliest regularly curled form. At the same time we find only I in capitals, not J—a modern letter made to correspond with little *j*. This at least seems to have been the history of the symbol in England, and possibly the French history is similar.

It follows from this that the value of J ought to have been in all languages, not that which it has with us, nor yet that which it has in France, but that which it has in Germany, *e.g.*, in "Jahr," our "year"—which is retained by us in the borrowed Hebrew word "Hallelujah." But generally in English J denotes the sound which is best represented by *dzh;* in this compound *zh* represents the French *j*-sound: the difference between the two may be well seen by comparing the English "John" with French "Jean."

JABALPUR, or JUBBULPORE, a British district in the commissionership of the Central Provinces, India, between 21° 12′ and 23° 56′ N. latitude, and between 76° 40′ and 81° 35′ E. longitude, bounded on the north by Panna and Maihar, on the east by Rewah, on the south by the districts of Mandla, Seoní, and Narsinhpur, and on the west by Damoh district. Pop., 687,233.

JABALPUR, or JUBBULPORE, the headquarters of the above district, is situated in a rocky basin, at an elevation above sea-level of about 1,458 feet, 165 miles northeast from Nágpur, and 108 miles southeast from Ságar. The population, almost entirely Hindu, was 89,708 in 1901.

JABIRU, according to Marcgrave, the Brazilian name of a bird, subsequently called by Linnæus *Mycteria americana*, one of the largest of the Storks, *Ciconiidæ*, which occurs from Mexico southward to the territory of the Argentine Republic. It stands between four and five feet in height, and is conspicuous for its massive bill, slightly upturned, and its entirely white plumage; but the head and neck are bare and black, except for about the lower third part of the latter, which is bright red in the living bird.

JABORANDI, a name popularly applied in a generic manner in Brazil and South America to a number of different plants, all of which possess more or less marked sialogogue and sudorific properties. In the year 1875 a drug was introduced under the above name to the notice of medical men in France by Doctor Coutinho of Pernambuco, its botanical source being then unknown. About the same time Holmes found that the commercial drug in England consisted to some extent of *P. Selloanus*, Engl., and his statement was afterward confirmed by Baillon, and also by Balansa, the latter of whom observed that species to be employed in Asuncion, and collected for exportation to Europe.

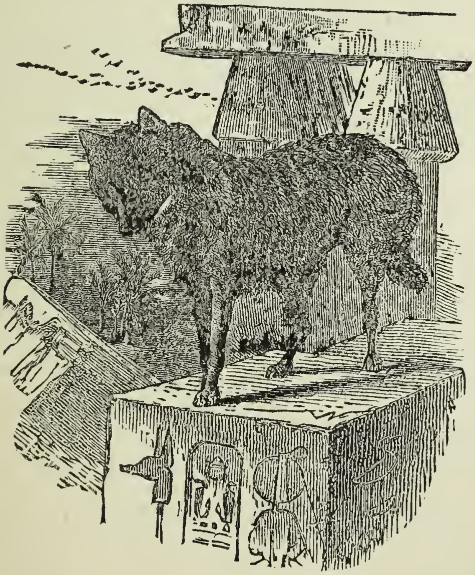
The physiological action of jaborandi is that of an extremely powerful diaphoretic and sialogogue. It acts as a sedative on the heart, probably influencing the circulation through the terminal branches of the vasomotor nerves, and widening the arteries and lessening their tension. The alkaloid (pilocarpine) does not cause the nausea and vertigo often resulting from the use of the crude drug. Atropine and pilocarpine have been proved to possess antagonistic and mutually antidotal properties. Jaborandi, in the form of liquid extract, tincture, or alkaloid, has been found useful in some forms of chronic pneumonia, in relieving pleuritic effusion in dropsy, in diabetes insipidus, in Bright's disease, as a galactogogue, and more recently in diphtheria. In small doses it restrains the perspiration of phthisis. It has also been proposed as a remedy for hydrophobia. As a mydriatic pilocarpine it is said to possess an advantage over eserine, inasmuch as it contracts the pupil of the eye to an equal extent, while it produces less irritation of the conjunctiva, less supraorbital pain, and less spasm of the accommodating apparatus.

JACA, a frontier city of Spain, in the province of Huesca, formerly capital of a partido in the kingdom of Aragon, is situated on the left bank of the Aragon.

JACAMAR, a word formed by Brisson from *Jacameri*, the Brazilian name of a bird, as given by Marcgrave, and since adopted in most European tongues for the species to which it was first applied and others allied to it, forming the family *Galbulidæ* of ornithologists, the precise position of which is uncertain, since the best authorities differ greatly thereupon. All will agree that the Jacamars belong to the great heterogeneous group called by Nitzsch *Picariæ*, but further into detail it is hardly safe to go. The *Galbulidæ* have zygodactylous feet, like the *Cuculidæ*, *Bucconidæ* and *Picidæ;* they also resemble both the latter in laying glossy white eggs, but in this respect they bear the same resemblance to the *Momotidæ*, *Alcedinidæ*, *Meropidæ*, and some other groups, to which affinity has been claimed for them.

JACANA, the Brazilian name, according to Marcgrave, of certain birds, since found to have some allies in other parts of the world, which are also very generally called by the same appellation. They have been most frequently classed with the Water-hens or Rails, but are now recognized by many systematists as forming a separate Family, *Parridæ*, whose leaning seems to be rather toward the *Limicolæ*. The most obvious characteristic of this group of birds is the extraordinary length of their toes and claws (the latter being turned upward), whereby they are enabled to walk with ease over water-lilies and other aquatic plants growing in rivers and lakes. It is also remarkable for the carpal spurs with which its members are armed. In habits the Jacanas have much in common with the Water-hens, but that fact is insufficient to warrant the affinity asserted to exist between the two groups; for in their osteological structure, as already implied, there is much difference, and the resemblance seems to be only that of analogy.

JACINTH, a name given to the reddish brown variety of zircon, known also as *Hyacinth*. The hyacinthus of ancient writers appears to have been our sapphire, or blue corundum, while the jacinth or hyacinth of modern mineralogists may have been the ancient *lyncurium*. The true jacinth is a silicate of zirconium, crystallizing in the dimetric or tetragonal system, and exhibiting strong double refraction. Its hardness is denoted by 7.5; that is to say, it is harder than quartz but not so hard as topaz. The most distinctive feature of the stone, serving to distinguish it from other minerals with which it is likely to be confounded—such as garnet, topaz, and cairngorm—is its high specific gravity; this varies, however, in different varieties of zircon from 4.05 to 4.75. Most of the gems termed jacinth or hyacinth by jewelers belong to the deep orange-brown variety of garnet known to mineralogists as *essonite* or *cinnamon stone;* the lower specific gravity of the garnet serves to distinguish the false from the true jacinth. It is probable that many of the antique camei and intagli reputed to be jacinths are merely hyacinthine garnets.



JACKAL (*Canis aureus*), a carnivorous mammal belonging to the dog family (*Canidæ*), and believed by many naturalists to be one of the species from which certain of the semi-domesticated dogs of Asia and North Africa have been derived. It is dog-like in external appearance, and there is no constant difference between its structure and that of the small canine races. It resembles them in dentition, in the roundness of its eye pupils, in its period of gestation, and to a large extent also in its habits, while like the dog it is subject to hydrophobia. It grows to a height of fifteen inches at the shoulders, and to a length of about two feet, exclusive of its bushy, fox-like tail. Its fur is of grayish yellow color, darker on the back and lighter colored beneath. Jackals, of which there are several well-marked varieties, are widely distributed throughout southern Asia and the north of Africa. They are nocturnal animals, concealing themselves till dusk in woody jungles and other natural lurking places, thereafter sallying forth in packs, which sometimes number 200 individuals, and visiting farmyards, villages and towns in search of food. This consists for the most part of the smaller mammals and poultry, although their association in packs enables them also to hunt down antelopes and sheep. When unable to obtain living prey, they feed upon carrion and refuse of all kinds, and are thus useful in removing putrescent matter from the streets of Eastern towns.

JACKDAW, or simply DAW, the prefix being doubtless imitative of the bird's cry, as indeed is probably the substantive name—one of the smallest species of the genus *Corvus* (CROW), and a very well-known inhabitant of Europe, the *C. monedula* of ornithologists. In some of its habits it much resembles its congener the ROOK (*q.v.*), with which it constantly associates during a great part of the year; but, while the Rook only exceptionally places its nest elsewhere than on the boughs of trees and open to the sky, the Daw almost invariably chooses holes, whether in rocks, hollow trees, rabbit-burrows, or buildings. Nearly every church-tower and castle, ruined or not, is more or less numerously occupied by Daws.

The Daw displays the glossy black plumage so characteristic of the true Crows, varied only by the hoary gray of the ear-coverts, and of the nape and sides of the neck, which is the mark of the adult.

JACKSON, chief city of Jackson county, Mich., is situated on the Grand river, about seventy-five miles west of Detroit. The city is paved and lighted with gas, and several of the buildings are very handsome. It is the seat of the large State penitentiary. The commercial interests of the city are fostered by its position on no fewer than six railways; and its manufactures are assisted by the water power, afforded by the river, which flows through the town, and is spanned by an iron bridge. Jackson manufactures fireclay goods, railway and other carriages, chemicals, agricultural implements, etc., and has foundries, planing-mills, and flour-mills. The presence of bituminous coal in the neighborhood affords additional stimulus to trade; and the surrounding country is fertile. A business college and a system of graded schools are among the educational resources of the city. Population in 1900, 25,180.

JACKSON, capital of the State of Mississippi, and chief city of Hinds county, is pleasantly situated on the right bank of the Pearl river, about 180 miles north of New Orleans, with which it is connected by rail. The city is fairly well built; the chief buildings are the State capitol, the State penitentiary, and the institutions for the blind and for the deaf and dumb. One mile distant is the lunatic asylum. There are several good schools, and a State library of 15,000 volumes. The chief trade is in cotton, the average export being about 30,000 bales a year. Population in 1900, 7,816.

JACKSON, chief city of Madison county, Tenn., is situated on the Forked Deer river, about seventy miles northeast of Memphis. Its chief trade is in cotton, of which many thousand bales are exported annually. Jackson has flour and planing mills, and manufactories of railway and other carriages, besides smaller industries. Of its several educational institutions the chief is West Tennessee college, founded in 1844. The Southwestern Baptist university was opened in 1875. The population in 1900 numbered 14,511.

JACKSON, ANDREW, seventh president of the United States, was born March 15, 1767, at the Waxhaw or Warsaw settlement (whose position in relation to the later boundaries of North and South Carolina is unknown), whither his parents had immigrated from Carrickfergus in Ireland in 1765. Jackson had no regular education. He had some slight share in the war of independence, and was taken prisoner in 1781. He studied law at Salisbury, N. C., and was admitted to the bar and began to practice at Nashville, Tenn. In 1791, on the first incorrect report that Mrs. Rachel Robards (*née* Donelson) had succeeded in getting a divorce bill from her husband passed in Virginia, Jackson married her; when, later, it was passed, they were remarried. In 1796 Jackson assisted to frame the constitution of Tennessee, and represented that State in the Federal Congress, where he distinguished himself as an irreconcilable opponent of Washington. In 1797 he was elected a United States senator; but he resigned the following year. He was judge of the supreme court of Tennessee from 1798 to 1804. In 1804–5 he contracted a friendship with Burr; and at the latter's trial in 1807 Jackson was one of his conspicuous champions. Up to the time of his nomination for the presidency, the biographer of Jackson finds nothing to record but military exploits, in which he displayed perseverance, energy, and skill of a very high order. In 1806 he killed Charles Dickinson in a duel. In 1813, as major-general of militia, he commanded in the campaign against the Creek Indians in Georgia and Alabama, and there first attracted public notice by his talents. In May, 1814, he was commissioned as major-general in the regular army to serve against the English; in November he captured Pensacola, used by the English as a base of operations; and on January 8, 1815, he inflicted a severe defeat on the enemy before New Orleans. During his stay in New Orleans he declared martial law, and carried out his measures with unrelenting sternness, banishing from the town a judge who attempted resistance. When civil law was restored, Jackson was fined $1,000 for contempt of court; in 1844 congress ordered the fine with interest ($2,700) to be repaid. In 1818 Jackson received the command against the Seminoles. His conduct in following them up into the Spanish territory of Florida gave rise to much hostile comment in the cabinet and in congress; but the negotiations for the purchase of Florida put an end to the diplomatic question. In 1821 Jackson was appointed military governor of Florida, and there again he came into collision with the civil authority. From this, as from the previous troubles, John Quincy Adams extricated him.

In August, 1822, the house of representatives of Tennessee nominated Jackson for speaker; and in 1823 he was elected to the senate at Washington. The rival candidates for the office of president in 1824 were Adams, Crawford, and Clay. Jackson obtained the largest number of votes in the electoral college; but no one had an absolute majority. At the election by the house of representatives (February 9, 1825,) Adams was chosen. Jackson, however, was recognized by the abler politicians as the coming man: Van Buren and others, going into opposition under his banner, waged from the first a relentless and factious war on the administration. Van Buren was the most adroit politician of his time; and Jackson was in the hands of very astute men, who advised and controlled him. He was easy to lead when his mind was in solution; and he gave his confidence freely where he had once placed it. He was not suspicious, but if he withdrew his confidence he was implacable. When his mind crystallized on a notion that had a personal significance to himself, that notion became a hard fact that filled his field of vision. When he was told that he had been cheated in the matter of the presidency, he was sure of it, although those who told him were by no means so.

There was great significance in the election of Jackson in 1828. A new generation was growing up under new economic and social conditions. They felt great confidence in themselves, and great independence. They despised tradition and Old World ways and notions; and they accepted the Jeffersonian dogmas, not only as maxims, but as social forces—the causes of the material prosperity of the country. By this generation, therefore, Jackson was recognized as a man after their own heart. They liked him because he was vigorous, brusque, uncouth, relentless, straightforward, and open. They made him president in 1828, and he fulfilled all their expectations. He had 178 votes in the electoral college against 83 given for Adams. Though the work of redistribution of offices began almost at his inauguration, it is yet an incorrect account of the matter to say that Jackson corrupted the civil service. His administration is rather the date at which a system of democracy, organized by the use of patronage, was introduced into the federal arena by Van Buren. The administration had two parties in it from the first, Van Buren's and Calhoun's, and the president's interference in a purely private matter brought about a rupture. In April, 1831, the whole cabinet resigned; Jackson and Calhoun quarreled; and the former transferred to Van Buren his support for succession in the presidency.

In 1832 Jackson was reëlected by a large majority over Clay, his chief opponent. The battle raged mainly around the recharter of the Bank of the United States. It is probable that Jackson's advisers in 1828 had told him, though erroneously, that the bank had worked against him, and then were not able to control him. The first message of his presidency had contained a severe reflection on the bank; and in the very height of this second campaign (July, 1832,) he vetoed the recharter, which had been passed in the session of 1831–32. Jackson interpreted his reëlection as an approval by the people of his war on the bank; and, after the exciting episode of South Carolina's opposition to the tariff-rates, he pushed it with energy. In September, 1833, he ordered the public deposits in the bank to be transferred to select local banks, and entered upon the "experiment" whether these could not act as fiscal agents for the government, and whether the desire to get the deposits would not induce them to adopt sound rules of currency. During the next session the senate passed a resolution condemning his conduct. Jackson protested, and, after a hard struggle, the resolution was ordered to be expunged from the record, January 16, 1837

Jackson was very successful in collecting old claims against various European nations, for spoliations inflicted under Napoleon's continental system. Aiming at a currency consisting largely of specie, he caused the payment of these claims to be received and imported in specie as far as possible; and in 1836 he ordered land agents to receive for land nothing but specie. About the same time a law passed congress for distributing among the states $35,000,000 balance belonging to the United States, the public debt having all been paid. The eighty banks of deposit in which it was lying had regarded this sum almost as a permanent loan, and had inflated their credit on the basis of it. The necessary calling in of their loans in order to meet the drafts in favor of the states, combining with the breach of the overstrained credit between America and Europe and the decline in the price of cotton, brought about a crash which prostrated the whole financial, industrial and commercial system of the country for six or seven years. The crash came just as Jackson was leaving office; the whole burden fell on his successor, Van Buren.

Jackson is the only President of whom it may be said that he went out of office far more popular than he was when he entered. When he went into office he had no political opinions, only some popular notions. He left his party strong, perfectly organized, and enthusiastic, on a platform of low expenditure, payment of the debt, no expenditure for public improvements or for glory and display in any form, and low taxes. His name still remained a spell to conjure with, and the politicians sought to obtain the assistance of his approval for their schemes; but in general his last years were quiet and uneventful. He died near Nashville, June 8, 1845.

JACKSON, Thomas Jonathan (1824–1863). "Stonewall Jackson," a distinguished Confederate general in the American civil war, was born in Harrison county, Va., January 21, 1824, and came of that Scotch-Irish stock to whose hardy virtues the middle States of America are largely indebted for the pure and resolute virtues of their people. His early education was only such as could be furnished by an obscure country school. Thence he passed to West Point military academy, where, though he was at first impeded by his meager acquirements, his indomitable courage and conscientious diligence eventually raised him to a foremost place. At West Point he exhibited the qualities by which he was distinguished in the splendor of his career—courage, patience, constancy of purpose, inflexible fidelity to duty, and an artless simplicity of character which engaged instant and universal confidence. Graduating at twenty-two, he was appointed lieutenant of artillery in the army of the United States, and participated, with distinction, in several of the most important battles in Mexico. After the war he resigned his commission, and accepted the professorship of natural philosophy in the Virginia military institute at Lexington, a position which he held until the outbreak of hostilities between the Union and Confederate States. During his sojourn at Lexington, he entered the Presbyterian communion, and was remarkable ever after for the fervor of his religious devotion. In political discussions or agitations, Major Jackson—such was his title by brevet—had never engaged; but in principle and by profession he was a State-rights Democrat of the Virginia school: in other words, he maintained the legitimacy of negro slavery and the sovereign right of a State to withdraw from the Union, and therefore to the secession movement of 1861 he at once accorded his sympathy. On the organization of the Virginia troops he was commissioned colonel of infantry by Governor Letcher, who, long intimate with him, adequately appreciated his yet undisclosed military genius.

Jackson's first exploit in the war of secession was the capture, on May 3, 1861, of the Federal arsenal at Harper's Ferry. Soon afterward he received the command of a brigade—the brigade which, by its immovable fortitude at Bull Run, turned the tide of battle in that long, doubtful struggle, and, from the admiration of its comrades, extorted for itself and its chief the now historic name of "Stonewall."

Detached from the army at Manassas for separate service in the Shenandoah Valley, Jackson soon signalized his genius for war. Placing himself between the converging columns of Shields, Milroy, and Banks, he struck one after the other; and, with a force inferior to his adversaries separately, he eventually drove them back upon Washington in utter defeat. In this "campaign of the valley" Jackson displayed true military instinct and the highest military art. By vigilance, sagacity, celerity and secrecy of movement, and faultless tactical skill on the field of battle, he achieved the greatest possible results with the smallest possible means. His reputation was now fixed in the estimation alike of friend and foe; and, while the Confederate States were filled with the renown of his achievements, the Federal forces were in constant terror of his prowess. Having stayed the invasion of Virginia along the line of the valley, Jackson repaired to Richmond to concert with Lee the deliverance of the Confederate capital, then closely pressed by McClellan. Appointed, meanwhile, to the command of a corps, he suddenly revealed himself on the right flank of the Federal army at Mechanicsville; and in a series of desperately fought engagements he routed the besieging army, and drove McClellan to shelter at Harrison's Landing. Richmond relieved, Jackson, without pause, hastened to confront Pope, who was menacing the city from the north. In the battle of Cedar Run he inflicted signal defeat upon that general, and compelled him to retrace his steps across the Rappahannock.

Reënforced by McClellan's army and fresh troops from the northern States, Pope made a stand at Manassas; but in the second battle on that field he suffered an overthrow as decisive as that sustained by McDowell in the first fight at Bull Run. As usual Jackson's corps bore the brunt of the battle; and as usual to his skill and courage the Confederate army was mainly indebted for its success. Following up the victory by the invasion of Maryland, Lee detached Jackson for an attack on Harper's Ferry, again in the hands of the Federalists, and garrisoned by 12,000 troops. In a few days the surrender of the place, with all its force and munitions of war, was announced to Lee, who, slowly retiring before McClellan, anxiously expected the arrival of Jackson, that he might turn and crush his pursuer. But before he could effect the desired junction Lee was brought to bay at Antietam, and compelled to accept battle under every disadvantage. Jackson now arrived, however, with two of his divisions, and his presence not only averted an otherwise inevitable disaster, but rescued the Confederate army from the destruction which awaited it if defeated with its rear resting on the river. Henceforth Jackson's operations were under the immediate eye and command of Lee; and, while at Fredericksburg and Chancellorsville his gallantry was as conspicuous as ever, to his illustrious chief belongs the glory of those hard-fought fields.

On the afternoon of May 2, 1863, Jackson fought his last battle. Executing a plan of his own conception, he suddenly struck the flank of the Eleventh Federal Corps, and drove it pell-mell before him. Night fell with the hostile forces in close proximity; and, while Jackson was making a reconnaissance with a view to pressing the pursuit, he was fired on in the dark by men of his own command, and received wounds of which he died on May 10, 1863. His death smote the Confederates with a pang of unspeakable anguish. The fall of their foremost chieftain was bewailed as the omen of the fall of the party.

JACKSON, William (1730–1803), an English musician of repute, was born at Exeter.

JACKSONVILLE, the chief city in Duval county, Fla., and the largest in the State, is situated on the west bank of the St. John's river, twenty-five miles from the sea. The city is regularly built. The streets, many of which are pleasantly shaded with trees, are laid out on the common American rectangular system. Jacksonville exports very large quantities of lumber, besides fruit, cotton, sugar, and fish, and carries on a coasting trade with Charleston, Savannah, and St. Augustine. The fine, salubrious climate attracts numerous visitors and invalids from the northern States. Jacksonville, which owes its name to President Jackson, was laid out as a town in 1822. In 1900 its population was 28,429.

JACKSONVILLE, the chief city of Morgan county, Ill., on Mauvaiseterre Creek, a tributary of the Illinois river, is situated at the intersection of several railways, about 200 miles south-southwest of Chicago. Its streets are wide and generally well shaded. The public buildings include State institutions for the blind, the feebleminded, the deaf and dumb, and the insane. Among the educational institutions, which are numerous, are Illinois College, three colleges for women, and a conservatory of music. There is also a free library, with reading-room. The population in 1900 was 15,078.

JACOB (meaning "one who seizes the heel" or "supplants"), the younger son of Isaac and Rebekah, and the father of the twelve patriarchs. According to the Elohistic (Levitical) narrative in Genesis, he was born in the land of Canaan when his father was sixty years of age. After Esau, his twin brother, at the age of forty years had married two Hittite wives, Isaac at the instigation of Rebekah sent Jacob with his blessing to Padan Aram, there to seek a wife in the family of his maternal uncle Laban. Arriving at his destination, he married Rachel (to whom Bilhah was given as a maidservant); the same narrative implies also his union with Leah (whose maid was Zilpah). Before he left Padan Aram he became the father of twelve sons, including Benjamin. On his return, with the property he had acquired, to his father in Canaan, God met him and blessed him and changed his name from Jacob to Israel; the place where this occurred was called by him Bethel. In the course of a further migration southward, Rachel died at a point not far from Ephrath (Bethlehem); finally Mamre, near Kirjath Arba (Hebron), where Isaac was living, was reached, and a permanent settlement appears to have been made until the death of Isaac there at the age of 180 years. The subsequent migration of Jacob to Egypt with his household of seventy souls is then briefly indicated, and his hospitable reception as an old man of 130 by Pharaoh. A residence was assigned to the colony in the best part of the land, the land of Rameses, by Joseph, and here the Israelites prospered much and rapidly increased. Seventeen years after the interview with Pharaoh the patriarch died, after having blessed his sons and particularly Joseph, whose two sons Ephraim and Manasseh he put upon a level with Reuben and Simeon. He was buried by his family, according to his own desire, in the cave of Machpelah, fronting Mamre, in the land of Canaan. The combined parallel narrative of the Jehovist and the other (elder) Elohist is much fuller, and in some points not easily to be reconciled with the preceding account. Various circumstances connected with the birth of the twins Isaac and Jacob are detailed; the partiality of Isaac for the elder and of Rebekah for the younger is indicated; Jacob's departure from Canaan is represented as a flight necessitated by his fraudulent conduct toward Isaac and Esau with reference to the blessing of the former; a revelation received at Bethel in the course of this flight is described; many minute particulars of his domestic life at Padan Aram and of his relations with Laban his uncle and father-in-law are given; the scene of the change of name is placed at Peniel, where he wrestled with the angel; a period of residence at Shechem is mentioned; the death of Rachel at Ephrath is said to have happened in childbed; after having fixed his home successively at Hebron and Beersheba, he is ultimately led by circumstances, which are described with much fullness and vividness, to migrate to Egypt, where he dies. Consideration of the relations of these parallel narratives may be postponed to the article PENTATEUCH.

JACOBÁBÂD, a municipality and the chief town of the frontier district of Upper Sind, India. Laid out in 1847 by Gen. John Jacob, on the site of the village of Khangarh, it is now the headquarters of the large military force of the Upper Sind frontier, and also of the local civil administration. It contains therefore a considerable European population, and possesses all the usual public offices and institutions of an important station. Population about 13,000.

JACOBI, FRIEDRICH HEINRICH, a distinguished writer on philosophy, was born at Düsseldorf, on January 25, 1743. With Wieland he contributed to start a new literary journal, the *Mercury*, in which some of his earliest writings, mainly on practical or economical subjects, were published. Here, too, appeared in part the first of his philosophic works, the *Correspondence of Allwill*, a combination of romance and speculation, containing a remarkable delineation of that which we may call the principle of the early romantic school of Germany. This was followed in 1779 by *Woldemar*, a philosophic novel, of very imperfect structure, but full of genial speculation, and giving the most complete picture of Jacobi's method of philosophizing. The *Letters on Spinoza's Theory* expressed sharply and clearly Jacobi's strenuous objection to a demonstrative system in philosophy, and drew upon him the enmity of the Berlin clique, whose philosophic protagonist was Moses Mendelssohn.

Jacobi's next important work, *David Hume on Belief, or Idealism and Realism*, a dialogue, was an attempt to show not only that the term *Glaube* had been used by the most eminent writers to denote what he had employed it for in the *Letters on Spinoza*, but that the nature of the cognition of facts as opposed to the construction of inferences could not be otherwise expressed. In this writing, and especially in the *Appendix*, Jacobi came into contact with the critical philosophy, and subjected the Kantian view of knowledge to searching examination.

The outbreak of the war with the French republic induced Jacobi, in 1793, to leave his home at Düsseldorf, and for nearly ten years he resided in Holstein. While there he became intimately acquainted with Reinhold, in whose *Beiträge* his important work *On the Endeavour of the Critical Philosophy to Bring Reason to Understanding* was first published, and with Matthias Claudius, the author of the *Wandsbecker Bote*. During the same period the excitement caused by the accusation of atheism brought against Fichte at Jena led to the publication of Jacobi's *Letter to Fichte*, in which he made more precise the relation of his own philosophic principles to theology.

Soon after his return to Germany, Jacobi received a call to Munich in connection with the new academy of sciences just founded there. The loss of a considerable portion of his fortune induced him to accept this offer; he settled in Munich in 1804, and in 1807 became president of the academy. In 1811 appeared his last philosophic work, directed against Schelling specially, *On Divine Things*, the first part of which, a review of the *Wandsbecker Bote*, had been written in 1798. A bitter reply from Schelling was left without answer by Jacobi, but gave rise to an animated controversy, in which Fries and Baader took prominent part. In 1812 Jacobi retired from the office of president, and began to prepare a collected edition of his works. He died before this was completed, on March 10, 1819.

JACOBI, Karl Gustav Jacob, one of the great mathematicians of the present century, was born at Potsdam, of Jewish parentage, December 10, 1804. He studied at Berlin university, where he obtained the degree of doctor of philosophy in 1825, his thesis being an analytical discussion of the theory of fractions. In 1827 he became "extraordinary" and in 1829 "ordinary" professor of mathematics at Königsberg; and this chair he filled till 1842, when he visited Italy for a few months to recruit his health. On his return he removed to Berlin, where he lived as a royal pensioner till his death, February 18, 1851.

JACOBITE CHURCH, an ecclesiastical organization thinly spread over Syria, Mesopotamia, and Babylonia, having for its distinctive doctrinal principle the Monophysite thesis with regard to the person of Christ; it consequently accepts the decrees of the second ("Robber") synod of Ephesus, and rejects those of the council of Chalcedon. Its head is called the patriarch of Antioch, who has his residence, however, for the most part at Diarbekir; second to him is the "maphrian" (*i.e.*, "fertilizer"), who has a kind of primacy over the eastern section of the church. No accurate statistics as to the numerical strength of the Jacobite Church exist; its numbers may probably be safely placed considerably under 250,000.

JACOBS, Christian Friedrich Wilhelm, a German scholar and author, was born at Gotha, October 6, 1764. He died at Gotha, March 30, 1847.

JACOTOT, Joseph (1770–1840), a French educationist and author of the method of "Émancipation intellectuelle," was born at Dijon, March 4, 1770. After the revolution of 1830 Jacotot returned to France, and he died at Paris, July 30, 1840.

JACQUARD, Joseph Marie, inventor of the Jacquard silk-weaving loom, was born of humble parents at Lyons, July 7, 1752. The earlier part of his life is involved in considerable obscurity, though it is said that his mechanical talent was manifest from an early age. Jacquard married in 1777, and at the death of his father fell heir to two looms and a small sum of money. These, however, like Palissy's furniture, were sacrificed to the inventive pursuits of their owner, who was at last forced to become a lime-burner at Bresse, while his wife supported herself at Lyons by plaiting straw. In 1793 Jacquard took part in the unsuccessful defense of Lyons against the troops of the convention; but afterward served in their ranks on the Rhone and Loire. After seeing some active service, in which his young son was shot down at his side, Jacquard again returned to Lyons, where he succeeded in finding work. He still labored at his machines, and in 1801 a medal was awarded him for an invention which he exhibited in the industrial exhibition at Paris, whereby one workman per loom was superseded in the weaving of figured silks. Jacquard was summoned to Paris, and after interviews with Napoleon and Carnot was attached to the Conservatoire des Arts et Métiers. A loom of Vaucanson's, deposited there, suggested various improvements in his own, which he gradually perfected to its final state. In 1804 he returned to Lyons, and although his invention was fiercely opposed by the silk-weavers, whom it threatened to deprive of a livelihood, its advantages were too great to suffer resistance. Many years before his death, which occurred at Oullins, a village near Lyons, on August 7, 1834, the inventor had the satisfaction of seeing his loom in almost universal use, and, as a consequence, the prosperity of his native city rapidly advancing. Jacquard was rewarded with a pension of £60, a royalty of £2 upon each loom erected, and the cross of the Legion of Honor. His statue was erected in Lyons in 1840.

JADE, a name popularly applied to several distinct ornamental stones, but restricted scientifically to a definite mineral species known as *nephrite*. The term nephrite, from νεφρός, the kidney, refers to the reputed value of the mineral in renal diseases, whence it was formerly known as *Lapis nephriticus*. Probably the word *jade* is a corruption of the Spanish *hijada*, since this mineral is one of the stones which were known to the Spanish conquerors of Mexico and Peru under the name of *piedra de hijada*, or "stone of the loins"—a name which first appears in the writings of Monardes, in 1565, as *piedra de la yjada*.

JAEN, a province of Spain, in the northeast of Andalucia, is bounded on the north by Ciudad Real, on the east by Albacete and Granada, on the south by Granada, and on the west by Cordoba, and has an area of 5,184 square miles. It may be described in general terms as consisting of the upper basin of the Guadalquivir, by which it is traversed from east to west. The mineral wealth of Jaen, which has been known from the time of the Romans, is great, and the mining industry (Linares) is the most important in the province. Agriculture is in a very backward state, the grain produced being insufficient for local demands. The total population in 1897 was 463,806. There are twenty-four towns with a population exceeding 5,000—the most important being, besides Jaen the capital, Alcalá la Real, Andújar, Baeza, Bailen, Linares, Martos, Ubeda.

Jaen, the capital of the above province, is picturesquely situated thirty-seven miles north of Granada and 120 miles east of Seville, on the Jaen (an affluent of the Guadalquivir), at the base and on the slopes of an acclivity surmounted by an ancient Moorish citadel with which the walls of the city are connected. The population in 1897 was 27,392.

JAFFA. See Joppa.

JAFFNA, or Jaffnapatam, a town of Ceylon, situated in a peninsula of the same name at the northern extremity of the island. It is a place of 34,684 inhabitants, and, besides the usual administrative buildings of a district-town, it has a college (established in 1872) and a public library.

JAGÁDHRI, a municipal town in Ambálá district, Punjab, India, is situated a little west of the river Jumna, thirty-seven miles southeast of Ambálá city, and three miles north of the Sind, Punjab, and Delhi Railway.

JAGUAR (*Felis onca*). This powerful and ferocious animal is the largest of the species of *Felidæ* found upon the American continent. It ranges from Texas through Central and South America into Patagonia. In the countries which bound its northern limit it is not frequently met with, but in South America it is still quite common, and Azara states that when the Spaniards first settled the district between Montevideo and Santa Fé as many as two thousand were killed yearly. The jaguar is usually found singly, or sometimes in pairs, and preys upon such quadrupeds as the horse, tapir, capybara, dogs, or cattle, and its strength is so great that it has been known to swim with a horse it had killed across a wide river, and then to carry its prey into the woods. It rarely slays at a time more than is requisite to satisfy its hunger, and leaves the unconsumed portions for the benefit of any stray prowler who may find them. Its manner of killing its victim is, after springing upon it, to strike it to the earth by a blow of its powerful paw. The female brings forth from two to four cubs toward the close of the year; they are able to follow their mother in about fifteen days after birth. The color of the jaguar varies greatly among individuals, ranging from white to black, the rosette markings in the extremes being but faintly visible. The general or typical coloration is a rich tan upon the head, neck, body, outside of legs, and tail near the root. The upper part of the head and sides of the face are thickly marked with small black spots, and the rest of body is covered with rosettes, formed of black spots, with a black spot in the center, and ranged lengthwise along the body, in five to seven rows on each side.

JAHÁNÁBÁD, a town in Gayá district, Bengal, situated on the Patná road. Population about 24,022—namely, 12,413 Hindus and 8,609 Mahometans.

JAHN, Johann, a distinguished Orientalist and Biblical critic of the Roman Catholic Church, was born at Tasswitz, Moravia, on June 18, 1750. He died August 16, 1816.

JAHN, Otto, eminent alike as an archæologist, philologist, and art critic, was born June 16, 1813, at Kiel, Germany. In 1867 he was called to succeed Gerhard at Berlin; but after a lingering illness he died at Göttingen, September 9, 1869.

JAINS, the most numerous and influential sect of heretics, or nonconformists to the Brahmanical system of Hinduism, in India, are found in every province of Upper Hindustan, in the cities along the Ganges, and in Calcutta. But they are more numerous to the west—in Mewar, Guzerat, and in the upper part of the Malabar coast—and are also scattered throughout the whole of the southern peninsula. They are mostly traders, and live in the towns; and the wealth of many of their community gives them a social importance greater than would result from their mere numbers. Of what their actual number may be it is unfortunately impossible to form any exact estimate, as in the census returns they are confounded with the Buddhists. Their magnificent series of temples and shrines on Mount Abu, one of the seven wonders of India, is perhaps the most striking outward sign of their wealth and importance.

JÁINTIA HILLS. For administrative purposes the Jáintia Hills are regarded as a subdivision of the Khási and Jáintia Hills district, in the province of Assam. They cover an area of about 2,000 square miles, and are bounded north by the district of Nowgong, east by Cachar, south by Sylhet, and west by the Khási Hills.

JÁIPUR. See Jeypore.

JÁISALMIR, a native state in Rájputána, under the political superintendence of that agency and the government of India, with an area of 16,447 square miles, is bounded on the north by Baháwalpur, on the east by Bíkaner and Jodhpur, on the south by Jodhpnr aud Sind, and on the west by Khairpur state and Sind. Jáisalmir is almost entirely a sandy waste, forming a part of "the Great Indian Desert."

JÁJPUR or Jajpore, a municipal town in Cuttack district, Bengal, is situated on the right bank of the Baitaráni river. Pop. (1901), 159,030.

JAKOB, Ludwig Heinrich von, a German writer on political economy, was born at Wettin, February 26, 1759. He died at Lauchstädt, July 22, 1827.

JALALABAD. See Afganistan.

JALANDHAR, or Jullundur, a British district in the lieutenant-governorship of the Punjab, India, forming the southernmost district in the division of the same name.

Jalandhar, a municipal town and cantonment in the above district. It lays claim to considerable antiquity, having been the original capital of the Rájput kingdom of Kátoch, which dates back to the period before Alexander's invasion. The population in 1868 was 50,067, of whom 15,921 were Hindus, 33,601 Mahometans, 468 Síkhs, and 77 Christians.

JALAP, a cathartic drug consisting of the tuberous roots of *Exogonium Purga*, Benth., a convolvulaceous plant growing on the eastern declivities of the Mexican Andes at an elevation of 5,000 to 8,000 feet above the level of the sea, more especially about the neighborhood of Chiconquiaco, and near San Salvador on the eastern slope of the Cofre de Perote. Jalap has been known in Europe since the beginning of the seventeenth century, and derives its name from the city of Jalapa in Mexico, near which it grows, but its botanical source was not accurately determined until the year 1829.

Jalap owes its properties to *jalapin*, a resin which is present in it to the extent of 12 to 18 per cent. According to Dr. W. Rutherford, jalap acts as a powerful hepatic and intestinal stimulant. It is used as a hydragogue cathartic in combination with cream of tartar in dropsy, and in all cases where it is desirable to cause a copious watery evacuation, also as a vermifuge.

JALAPA, or Xalapa, the Aztec Xalapan, a town of Mexico, in the state of Vera Cruz, and about seventy miles inland from the city and port of that name, with which it communicates by a railway opened since 1870. The population is stated at 14,000.

JALÁUN, a British district in the lieutenant-governorship of the Northwestern Provinces of India, with an area of 1,553 square miles, and forms the northern district of the Jhánsi division. The district lies entirely within the level plain of Bundelkhand, north of the hill country, and is almost surrounded by the Jumna and its tributaries the Betwa and Pahúj. The central region thus inclosed is a dead level of cultivated land, almost destitute of trees, and sparsely dotted with villages. The southern portion especially presents one unbroken sheet of cultivation. The boundary rivers form the only interesting feature in Jaláun. The little river Noh flows through the center of the district, which it drains by innumerable small ravines instead of watering. Jaláun has little picturesqueness or beauty, but possesses great fertility and abundant agricultural resources.

Jaláun, a decayed town in the above district, and the former capital of a native state. It occupies a large area, and contains a considerable number of good houses, and a ruined fort.

JÁLNA, or Jaulna, a town in Hyderabad state, southern India, 210 miles northeast of Bombay.

JÁLPÁIGURÍ, or Julpigoree, a British district of India, forming the northeastern part of the Rájsháhí Kuch Behar division, under the lieutenant-governor of Bengal. It consists of an irregularly shaped tract south of Bhután and north of the state of Kuch Behar and Rangpur district, with an area (1855) of 290,464 square miles.

Jálpáigurí, the administrative headquarters of the above district, is situated on the west bank of the Tístá.

JAM. See Jams and Jellies.

JAMAICA, an island lying between the Caribbean Sea and the Gulf of Mexico, and about eighty miles to the southward of the eastern extremity of the island of Cuba. It is the largest island of the British West Indies, being 135 (or, as sometimes stated, 144) miles in length and 21½ to 49 miles in breadth. Its area is about 4,200 square miles, or, as stated in the Report of the Geological Survey, 3,250 square miles. Within its government are comprised the three small islands called the Caymanas—Grand Cayman, the principal of these, lying off the center of the Yucatan passage; British

Honduras has a lieutenant-governor under the general government of Jamaica, although distant 660 miles, on the mainland of Central America; and Turks and Caicos Islands were annexed to Jamaica in 1874.

The surface of Jamaica is usually hilly or mountainous, and there is a great variety of climate, according to situation and elevation. The largest extent of level land is to the westward, where the lowlands are near the sea. The form of the coasts presents the outline of a turtle, the mountain ridges representing the back. The highest elevations are situated to the east, the inclined slope rising from the west. Vestiges of intermittent volcanic action occur. From the sea-level on all sides a series of ridges gradually ascend toward the central range, dividing the large rivers, and rising occasionally into peaks of 6,000 feet. The vapors ascending from the rivers and surrounding ocean produce in the upper regions clouds saturated with moisture, which induce vegetation belonging to a colder climate. During the rainy season there is such an accumulation of vapor as to cause a general coolness over the island, and of course occasioning very sudden and heavy showers, and sometimes destructive floods. Upward of one hundred and fourteen rivers or streams find their way from the interior to the sea, besides the numerous tributaries which issue from every ravine in the mountains. These streams for the most part are not navigable; in times of flood they become devastating torrents. In the parish of Portland, the Rio Grande receives all the smaller tributaries from the west; there is scarcely a mile width between any of these streams, and the land rises about 1,000 feet to the mile. In St. Thomas in the east, the drainage of the main ridge is performed by the Plantain Garden river, the tributaries of which form deep ravines and narrow gorges in the mountains, which unite and descend, the valley of the Plantain Garden expanding out into a most picturesque and fertile plain. Black River flows through a level country, and is accessible to small craft for about thirty miles. Salt River and the Cabarita, both also on the south side, are navigable by barges. There are several medicinal springs. Jamaica has sixteen harbors, the chief of which are Port Morant, Kingston, Old Harbor, Green Island, Montego Bay, Falmouth, Port Maria, St. Ann's Bay, Lucea, and Port Antonio, besides numerous bays, roadsteads, and shipping stations affording tolerable anchorage. The surface of the valleys and level lands consists of alluvial deposits composed of sediment derived from the disintegration of the higher land. The red soil is particularly favorable for coffee growing. The area occupied by the Coast Limestone and White Limestone represents about five-eighths of the island. The substructure of Jamaica consists of igneous rocks. In economic geology Jamaica produces a great variety of marbles, porphyrites, granite and ochers. Traces of gold have been found associated with some of the oxidized copper ores of the Clarendon mines. Copper ores are very widely diffused, though the working of the veins has been found too expensive. Cobalt and lead have been worked, but hitherto unprofitably. Manganese occurs, also iron ores and a form of arsenic. There is a great variety (and at the same time great equability) of climate. Parts of the island are extremely favorable for sufferers from tubercular disease. The island is generally healthy, though sometimes subject to yellow fever, like most tropical countries. Hurricanes, when they occur, come between July and October. The periodical rains, which generally last for six weeks, constitute the May and October seasons.

The vegetable productions are very numerous. There are forest trees fit for every purpose; among these are the ballata, rosewood, satinwood, mahogany, lignum vitæ, lancewood, and ebony. The logwood and fustic are exported for dyeing. There are also the Jamaica cedar, and the silk cotton tree. Pimento (peculiar to Jamaica) is indigenous, and furnishes the allspice. The bamboo, coffee, and cocoa are well known. Several species of palm abound—the macaw, the fan palm, screw palm, and palmetto royal. There are plantations of cocoanut palm. The government is raising cocoanuts with profit on a barren spit of sand by the sea. Cinchona plantations have recently been successfully established in the mountains, the produce selling well in the London market. The other noticeable trees and plants are the mango, the breadfruit tree, the pawpaw, the lacebark tree, and the guava. The *Palma Christi*, from which castor oil is made, is a very abundant annual. English vegetables grow in the hills, and the plains produce plantains, cocoa, yams, cassava, okra, beans, peas, ginger, and arrowroot. Maize and guinea corn are cultivated, and the guinea grass, accidentally introduced in 1750, is very valuable for horses and cattle—so much so that pen-keeping or cattle-farming is a highly profitable occupation. Among the principal fruits are the orange, shaddock, lime, grape or cluster fruit, pineapple, mango, banana, grapes, melons, avocado pear, breadfruit, and tamarind. There are public gardens at Kingston, at Castleton, about twenty miles from Kingston, and at Bath, and an experimental plantation of different varieties of cane at Hope plantation. The sugar cane was cultivated at an early period, for in 1671 there were a number of sugar-works. There are many beautiful flowers, such as the aloe, the yucca, the datura, the mountain pride, the *Victoria regia*; the cactus tribe is well represented. Innumerable varieties of ferns grow in the mountains, and orchids in the woods. The sensitive plant grows in pastures.

There are fourteen sorts of *Lampyridæ* or fireflies, besides the *Elateridæ* or lantern beetles. There are no venomous serpents, but plenty of harmless snakes and lizards. The large lizard, the iguana, is eaten, as are also the land crab and tortoise. The scorpion and centipede are poisonous, but not very dangerous. Ants, mosquitoes, and sandflies swarm in the lowlands. Gosse enumerates twenty different song birds in Jamaica. Parrots, pigeons, guinea fowl, and a great variety of water birds are found. The sea and rivers swarm with fish, and turtles abound. The seal and manatee are sometimes found, and the crocodile. The domestic animals are those of the ordinary English kind. Jamaica beef and pork are very good. Poultry succeeds well.

The population was returned in the census of 1844 as 380,000, of whom 16,000 were white, 68,000 colored, and the rest black. In 1861 it was returned at 441,000, of whom 14,000 were whites, 80,000 colored, and 347,000 black. In 1871 the numbers were 13,000 white, 100,000 colored, 393,000 black; total, 506,000. The census of 1898 shows a total of 745,104—a large increase in the black and colored population, and a stationary number of white people.

Kingston, the capital, is on the south coast. It was founded in 1693, and is built on a plain which rises from the shore with a gradual ascent to the foot of the Liguanea mountains. This plain is covered with country residences and sugar estates. The town population in 1890, together with Port Royal, is 30,000. It is now estimated at over 46,542. The seat of government was some years ago transferred from Spanish Town to Kingston, and the principal civil and judicial business is transacted there.

Jamaica was discovered by Columbus and possession taken in the name of the king of Spain on May 3, 1494. He called it St. Jago, but it is known by its Indian name Jamaica, "the isle of springs."

JAMES. This name, the Hebrew *Yakob* or Jacob, belongs to several persons mentioned in the New Testament, of whom the first that appears in the Gospel is:

1. *James the son of Zebedee.* He was among the first who were called to be Christ's immediate followers and afterward chosen to be His apostles, and is one—the others being Peter, Andrew, and John (the brother of James)—of the always first-mentioned, and as the narrative shows, most remarkable group of the apostolic band.

2. *James the son of Alpheus.* He also was one of the apostles, and is mentioned in all the four lists by this name, but in no other place. It is, however, thought by some that he is the same with

3. *James the Lord's brother.* In Matt. xiii. 55 and Mark vi. 3 the brethren of the Lord are named James, Joses, Judas, and Simon. It is also to be remarked that they are in both places spoken of as the children of the carpenter, that is, of Joseph the husband of the Virgin Mary. But it has been urged that they were called sons of Joseph and Mary because the children of two families—of Mary the Virgin and Mary the wife of Clopas, her half-sister—were brought up together. Those who in this way make James the Lord's brother to be a son of Alpheus require to establish (*a*) that Clopas is the same name as Alpheus, (*b*) that Mary the wife of Clopas was the sister of the Virgin Mary, and (*c*) that this Mary, wife of Clopas, is the same who is called Mary the mother of James and Joses, and simply the mother of James, in which four passages the same person is evidently intended. But the identity of the names Alpheus and Clopas is by no means certain. It seems right to conclude that James the son of Alpheus, one of the apostles, was a different person from James the Lord's brother and bishop of Jerusalem.

JAMES, THE GENERAL EPISTLE OF. Of the author of this epistle enough has been said in the previous article (3); it only remains to add in connection with the introductory words thereof that probably the same reason actuated both St. James and St. Jude to leave out any mention that they were "brethren of the Lord." We need not enter into the question of what relationship is intended by those words, though, from the mention of Joseph on each occasion where the "brethren" are spoken of, it is probable that they were really his children by a former marriage. Thus Jesus would be younger than those who are called "his brethren," and their behavior in rejecting his teaching for so long a time may have been partly a result of their growing up with him and regarding him as a younger member of the same family, and from familiarity becoming less willing than strangers would be to acknowledge anything which looked like an assertion of superiority. But, whatever the reason for their former unbelief, it is easy to see that, when they had at length come to own Jesus as their Lord, humility would check the mention of the relationship in which they might claim to stand to Jesus, as would also a desire not to appear to place themselves in a position of close connection with Christ, to which none others could lay claim.

The epistle is addressed "to the twelve tribes which are of the dispersion." The word "dispersion" was employed in the New Testament times to signify the Jewish population in every part of the then known world. Jews were to be found in Persia, Egypt, Asia Minor, and indeed in all the lands surrounding the Mediterranean Sea. When the writer addressed them as "the twelve tribes" he gives us the key to the character of his epistle. It was written to Christians who had been converts from Judaism, but to whom their ancient faith was still of the very highest importance, indeed, of somewhat more importance than it ought to have been. We can see therefore why the language of this epistle partakes so largely of the character of the preaching of John the Baptist, and of that of our Lord's earliest teaching in the Sermon on the Mount, and why it is so largely illustrated by the language of books like Ecclesiasticus and the Book of Wisdom, which were specially esteemed by the Jews of Alexandria and other Hellenistic centers of Judaism. We should judge from this that the bishop of Jerusalem, in the earlier days of the Christian church, availed himself of his central position to circulate among the scattered Judæo-Christian populations, of whom representatives would constantly be within his reach, such a letter as was suited to stimulate the new converts to more truly Christian life, and to check errors into which, from their attachment to the older faith, they were prone to fall. The epistle contains many exhortations to accept a higher standard for the conduct of life, though a considerable section applies more specifically to the dangers that beset Jewish converts of trusting to a faith which produced no results in the form of Christian love.

The epistle contains nothing to indicate where it was written, but at the same time there is nothing in the imagery and illustrations employed by the writer which would be out of character with one writing in Palestine. It is therefore probable that, since tradition represents James as constantly resident in Jerusalem, the epistle was written there.

It appears to have been written with a view, in the first place, to comfort some who were undergoing severe trials. This is clear from the opening sentence, "Count it all joy when ye fall into divers trials." But the words also seem to show that there was a spirit prevailing, among those for whom the letter was first intended, which did not tend to that perfect patience under sufferings that should characterize the faithful Christian.

In the time of Eusebius (325 A.D.) the epistle of St. James was reckoned among the books not fully accepted by the church. But among the apostolic fathers we have quotations from it in the writings of Clement of Rome and perhaps of Hermas. Further, in the Syriac version of Melito's apology there are some passages which bear a striking resemblance to the words of St. James, and may have been quotations; and the Peshito Syriac version contains the epistle. Origen in his commentary on John, speaks of the epistle as in "circulation under the name of James," and he quotes from it in another place as that of James, without any comment. Dionysius of Alexandria, who was at the head of the catechetical school there (245), quotes from the epistle. These are all the notices of the epistle on which dependence can be placed before the council of Laodicea (363), when it was included among the canonical books. But there seems no doubt that the words "well known and recognized by most," used by Eusebius, indicate that the epistle was by him regarded as a part of Scripture, for in other portions of his works he alludes to it as if he so esteemed it, and evidence of its recognition in the Syrian Church speaks strongly in favor of its authenticity.

JAMES I., king of Scotland, third son of Robert III. and of Annabella Drummond of Stobhall, was born at Dunfermline in 1394. The king, in order to secure the safety of his son, resolved in 1405 to place him under the protection of the king of France. The prince, however, on his way thither fell into the hands of the English, and Henry IV. determined not to admit him to ransom. On the death of his father, April 13, 1406, James became nominal sovereign, but, as he was still retained in captivity in England, the duke of Albany continued regent, and was succeeded, on his death in 1419, by his son Murdoch. At first James was confined in the Tower of London, but in 1407 he was removed to the castle of Nottingham, where he enjoyed as much liberty as was compatible with detention, and was treated in all respects by his governor, Sir John Pelham, as a member of the household. Henry V., on succeeding his father in 1413, removed James to close confinement in the Tower, but shortly afterward took him to Windsor, and in 1417, with the view of detaching the Scotch auxiliaries from the French standard, invited him to accompany him in his expeditition against France. From this time, and especially after the death of the duke of Albany in 1419, James was treated with much consideration; and, having given a pledge of his friendly intentions toward England by his marriage with Lady Jane Beaufort, February 2, 1424, he finally obtained his release in the end of March of the same year, the Scottish nation agreeing to pay a ransom of £40,000, in name of expenses for his maintenance while in captivity.

With the reign of James I., whose coronation took place at Scone on May 21st, may almost be said to begin the substitution in Scotland of constitutional sovereignty, regulated by definite principles and laws, and modified by a regard to the opinions and interests of the subjects, for the indefinite authority of the king and the arbitrary rule of the nobles. It is true that after his death the lawless contests of the nobles broke out as fiercely as ever, but by his energetic repression of their violence during his lifetime, and more especially by the virtual creation of statute law modeled on that of England, and the additional importance assigned to parliament, the leaven was partly prepared which was to work toward the destruction of their unlicensed influence. During a session of the parliament held at Perth on March 12, 1425, James suddenly arrested a large number of the nobles, including the duke of Albany and his two sons, whom, along with the earl of Lennox, he caused to be executed. With similar strategy he, at a parliament held at Inverness in 1427, arrested Donald of the Isles and fifty of his chiefs. Donald, however, on making all due submission, received his liberty; but when, in violation of his oath, he made an abortive attempt to assert his independence, the king, on his making unconditional surrender, confined him to Tantallon castle. As was natural, the energetic rule of the king, and especially his stringent coërcion of the nobles, aroused a secret purpose of revenge; and, acting on the inspiration of the earl of Athole, uncle of the king, Sir Robert Graham and other accomplices with a band of 300 Highlanders, suddenly, on the evening of February 20 or morning of February 21, 1437, entered the apartment of the king in the priory of the Dominicans at Perth, and stabbed him to death with their daggers.

JAMES II., twin son of James I., was born in 1430, and, Alexander, his elder brother, having died in infancy, was shortly after the assassination of his father crowned king at Holyrood. During his minority the house of Douglas used every endeavor to extend their influence—William, who succeeded to the earldom in 1443, ultimately making no pretension to conceal his claims to independent sovereignty, and at the festivities in 1449, in honor of the king's marriage to Mary of Gueldres, with ostentatious bravado, bringing in his train as many as 5,000 followers. Shortly after the king attained his majority he, in 1452, invited Douglas to become his guest in Stirling castle, and, on his refusing to break the "bands" he had made with the other nobles, in sudden passion stabbed him with a dagger, after which Sir Patrick Grey completed the assassination with a poleax. It was not till 1454 that the struggle following this act of violence, which involved all Scotland in a series of intermittent contests, was brought to a close by the flight of the Douglas and the forfeiture of his estates to the crown. His own kingdom being freed from distraction, James resolved to take advantage of the protracted intestine conflict in England, known as the Wars of the Roses, to wrest from the English the possessions they held in the south of Scotland; but while conducting the siege of Roxburgh castle he was killed by the bursting of a cannon, August 3, 1460.

JAMES III., king of Scotland, son of James II., was born June 1, 1452, and shortly after the death of his father was crowned king at Kelso. The custody of the young prince was intrusted to Bishop Kennedy of St. Andrews, but in 1466 he was seized at Linlithgow by Lord Boyd, who in this way succeeded in obtaining the governorship of the royal fortresses, and also won the apparent friendship of the king. James was, however, as fickle and faithless as he was weak and pliant, and while Lord Boyd's eldest son, who had been created earl of Arran, and had married the king's sister, was absent in the summer of 1469 on an embassy to bring home the king's bride, Margaret of Denmark, the enemies of the Boyds set agencies in motion for having them tried for their seizure of the king. The earl of Arran, obtaining news of their machinations before landing, returned to Denmark; Lord Boyd fled to England; but Sir Alexander, brother of Lord Boyd, suffered execution, and the estates of the family were forfeited. James, whether the fault was his own or not, was sadly unfortunate in his connection with his near relations. While his brother-in-law was a fugitive from his vengeance, his two brothers were also, whether justly or not, the objects of his animosity and dread. The earl of Mar, the younger brother, died at Craigmillar castle under circumstances so suspicious that he was generally believed to have been murdered; and the duke of Albany the elder, making his escape from Edinburgh castle to France, afterward in 1482 came to an agreement with Edward IV. to hold the kingdom as his vassal. The rivalry of Albany was the more formidable because James by the preference which he showed for artists and musicians and by his retired and reserved manners had alienated the majority of the nobility. While James in the summer of this year was leading an army against England, the nobles, headed by Douglas, suddenly at Lauder seized Cochrane and several of the king's other favorites, and, having hanged them before his eyes, returned with their royal captive to Edinburgh castle. On this Albany suddenly made his appearance, and, having demanded and received the king's liberty, assumed, with apparently no objection on the part of James, the sovereignty of the kingdom, until an accusation for treasonable connections with England compelled him to flee thither. For some years after this Scotland enjoyed both outward and inward tranquillity, but the jealousy of the nobles against the king's favorites induced them in 1488, along with the young prince, afterward James IV., to raise the standard of rebellion. The two armies met at the stream of Sauchieburn, near Stirling, but hardly had they come to blows when the king fled in panic from the field. In his flight he was thrown from his horse, and being received into the cottage of a miller near Bannockburn, was there (June 11th) stabbed to death by a person unknown, undoubtedly a straggler from the hostile army.

JAMES IV., king of Scotland, son of James III., was born March 17, 1472, and on the death of his father in 1488, was crowned king at Scone, probably on June 26th. As he not only adopted an entirely opposite policy with the nobles from his father, but also showed great affability toward the lower classes of his subjects, among whom he delighted to wander incognito, few kings of Scotland won such general popularity or passed a reign so untroubled by intestine broils. His libertinism was overlooked on account of his open and friendly bearing, and was to some extent atoned for by his hardiness and courage and his just and temperate rule. So slight were the attempts at insurrection on his accession to the throne that they scarcely required repression; and, although in 1491 Lord Bothwell and others entered into an agreement with Henry VII. to seize his person, the circumstances were always such as either not to require or not to favor the carrying out of the project. Indeed, Henry seems throughout to have greatly preferred the friendship of the Scotch monarch either to his active hostility or his enforced submission; and accordingly, although James had welcomed "Perkin Warbeck," the pretender to the English throne, and made a futile invasion of England in support of his claims, Henry, after Warbeck left Scotland in 1497, was willing to forget all old causes of enmity. In September of that year a truce of seven years was negotiated between the two monarchs, and in August, 1503, the alliance was confirmed by the marriage of James with the princess Margaret of England—a union which led eventually in default of the Tudors to the accession of the Stuart dynasty to the English throne. Of the peace with England James took advantage to establish order in the Highlands, where he introduced a more complete legal jurisdiction. After the accession of Henry VIII. it became apparent that the friendly relations with England were no longer possible; and James, having several private grounds of quarrel, was induced by the king of France to venture in 1513 on an invasion of England. His methods of warfare seem, however, to have been formed chiefly according to notions borrowed from the knightly tourneys, the organization of which had made him famous throughout Europe; and on the threshold of his enterprise he was slain on September 9th at Flodden Field, his death and the disastrous rout of his army being due to his rash, quixotic bravery.

JAMES V., king of Scotland, son of James IV., was born at Linlithgow April 10, 1512, and crowned king at Scone in October, 1513. At first the regency was vested in his mother, but after her marriage with the earl of Angus in 1514 the office was transferred by the estates to the duke of Albany. The English forebore to follow up their victory at Flodden, but the close connection of Albany with France now aroused the jealousy of Henry VIII., and Scotland was continually exposed to more or less serious attacks from the English until Albany, to whose arrogant bearing and French manners and habits not even the enmity against him of Henry could reconcile the estates, finally in 1524 took his departure to the country of his choice. Upon this James, through the scheming of Henry, was "erected" king in the Tolbooth of Edinburgh, ruling the kingdom by the advice of his mother and the lords in council. In 1526 James was persuaded to choose as his governor the earl of Angus, who kept him in close confinement until May, 1528, when he made his escape from Falkland, and put such vigorous measures in execution against Angus as compelled him to flee to England. In 1531 Angus, taking advantage of the discontent in the south of Scotland caused by the king's conduct toward the Armstrongs, and of the distracted condition of the Highlands, aided an English raid on the borders; but shortly afterward negotiations for peace were begun, and a treaty was finally signed in 1534. In January, 1537, James was married to Madeleine of France, but, she dying in July of the same year, he in June, 1538, espoused Mary of Lorraine. Henry VIII. was by no means satisfied with the influence he exercised in Scotch affairs, or the amount of deference he received from his nephew; and his jealousy receiving special provocation from the interest taken by James in foreign politics, he in 1542 dispatched an expedition against Scotland, which failed from want of a commissariat. James determined to make reprisals, but owing to the indecision of the nobles, who had no love of the enterprise, his army was scattered at the rout of Solway Moss on November 25th. On December 14th following James died at Falkland. His successor was his daughter Mary, born seven days before his death.

JAMES I., king of England. This sovereign, James VI. of Scotland, in whom the crowns of Scotland and England were united, was the son of Mary Queen of Scots and of Henry, Lord Darnley, and was born in the castle of Edinburgh, June 19, 1566. His mother while in captivity having been forced to abdicate the sovereignty, James was crowned king at Stirling, July 29, 1567. The regency was vested in the earl of Murray, who by his masterly political skill and force of character held the various factions in complete restraint until his assassination at Linlithgow in February, 1570. The absence of his authoritative will at once allowed free scope to the various elements of disorder latent in the kingdom, and during the regency of Lennox, who was mortally wounded in a fray at Stirling with the adherents of Mary, September, 1571, and of the earl of Mar his successor, who died in October, 1572, strife and confusion held almost rampant sway. The earl of Morton, the next regent, being possessed, however, of some of the high qualities of his predecessor, Murray, succeeded with assistance from Elizabeth of England in quelling the last embers of insurrection, and afterward held in check the interested ambition of the nobles, until in 1578 they succeeded in discrediting his influence by the scheme of placing the government nominally in the hands of the boy monarch. In June, 1581, Morton suffered death for his connection with the murder of Darnley. James, to whom were thus intrusted the functions of sovereignty, had spent his infancy under the care of the earl of Mar, on whose death he was taken charge of by the earl's brother, Alexander Erskine. For his principal tutor he had George Buchanan, who inspired him with a genuine interest in learning and a strong ambition to excel in poetical composition; he was also so far influenced by the Reformed type of religion as to have imbibed a love for theological argument, although he always cherished a strong distaste toward both Calvinistic doctrine and the Presbyterian form of government.

Taking advantage of the weakness of the royal authority during the king's minority, the General Assembly of the Scottish Church resolved, in 1581, to substitute Presbyterianism for Episcopacy, and James, being shortly afterward seized by the nobles at the raid of Ruthven, was unable to put his veto on their procedure, until after the overthrow of those implicated in the conspiracy, when, in 1584, the estates passed an act denouncing their assumption of legislative power. In 1585 James was besieged in Stirling by the exiled lords, and compelled to pardon them and dismiss his favorite, Arran. As their influence was backed by Elizabeth, and as the hopes of James were even thus early directed toward succeeding her on the English throne, he discovered it to be advantageous to disguise his sentiments toward the Presbyterians. The destruction in 1588 that overtook the Armada of the Catholic Philip of Spain deprived James of all anxiety regarding the effects of his mother's testamentary disposal of her crown to that monarch, but it naturally inclined him for a time to a more close alliance with the Protestants, the result of which was seen, not only in his marriage in 1589 to the Protestant princess Anne of Denmark, but in an act of the estates in 1592, which sanctioned the formal abolition of Episcopacy. In 1594 he also found it necessary to reduce the Catholic lords of the north of Scotland, but in 1597 he deemed it prudent to balance the influence of the Presbyterians, and also to flatter the hopes of the Catholics of England by securing the revocation of the forfeiture of the estates of the banished nobles, and permitting them to return. With the exception of his peculiar experiences in connection with the mysterious Gowrie conspiracy at Perth (August 5, 1600), the remainder of his reign in Scotland, until his succession to the English throne in 1603, was quiet and uneventful; and the only fact of notable importance connected with his subsequent government of that kingdom is his suspension of the meetings of the General Assembly, until by the banishment and imprisonment of Melville and its principal leaders he was able in 1610 to convene an Assembly which agreed to the organization of a modified Episcopacy. The peculiar union of talents and defects which constituted the character of James made him perhaps the most unfit successor of Elizabeth that could have been chosen. Having narrowly escaped a plot of the Catholics to seize his person shortly after his arrival in London, James resolved to flatter their hopes by granting them toleration, but his proclamation in February, 1604, against the Jesuits revealed the hollowness of his professions and led to the futile gunpowder conspiracy of November, 1605. Its discovery dissipated for the time the alienation already begun between him and the Commons on account of his imprudent assertion of his prerogative against the Puritans at the Hampton Court conference, and the subsequent disagreement in regard to ecclesiastical reform and a union with Scotland. Against the good-will of the Commons, which showed itself in the readiness with which a subsidy was granted for his debts, he, however, trespassed almost immediately by abusing the royal custom of placing impositions on merchandise. All attempts at a compromise on the subject having failed, James in February, 1611, dissolved the parliament, and a second parliament, which he summoned in 1614, proving equally recalcitrant, was also dissolved, the fact that it was not allowed the opportunity of transacting business earning for it from the courtiers the name of the "addled parliament." To help in filling the vacuum in his treasury, James had recourse with small success to the odious practice of demanding benevolences, and, in addition to various other misuses of his prerogative, to the excessive increase of monopolies, and to the virtual sale of peerages and other high offices. The administration of the affairs of the kingdom was at the same time gradually withdrawn from the council, and the whole executive authority intrusted to favorites. As the breach between him and his subjects gradually widened he became more anxious—both in order to supply himself with money and to obtain the support of an influential external authority—for an alliance with Spain, and in 1617 negotiations were entered into for a marriage between the young prince Charles and the Spanish infanta. But on the part of Spain those proposals were never seriously entertained. Their only result was to impart such irresolution to the policy of James in reference to the Bohemian insurrection as to afford Spain the opportunity of seizing the Palatinate; and by continuing to dangle the possibility of the marriage before the eyes of James the emperor succeeded in delaying his interference till the Palatinate was lost. Still intent on his purpose of the Spanish marriage, to which he had ruthlessly sacrificed the life of Sir Walter Raleigh, James dispatched his favorite Buckingham along with Charles to Madrid, and the return of the baffled and disappointed wooer in 1624 dissipated the last lingering sentiment of respect which the English nation may have cherished toward the king. Buckingham and Charles now virtually overrode the royal prerogative, and at their instance not only was war declared against Spain, but on the condition of granting toleration to the Catholics of England, a treaty of marriage between Charles and Henrietta Maria of France was signed at the close of 1624. James died on March 25, 1625.

JAMES II., king of England, and as king of Scotland James VII., second surviving son of Charles I. and Henrietta Maria, was born at the palace of St James', October 15, 1633, and was created duke of York in January, 1643. During the civil war he was taken prisoner by Fairfax at Oxford in 1646, but in 1648 he made his escape to Holland. After the second failure of the Stuart cause he served for some time in the French army under Turenne, but at the command of his brother he in 1656 accepted a military commission from Spain. At the Restoration in 1660 he was appointed lord high admiral and lord warden of the Cinque Ports. For the management of the civil administration of the navy he had the qualifications of industry and careful regard to details; and if his victory over the Dutch in 1665 was principally a happy stroke of good luck, and his drawn battle with De Ruyter in 1672 was more to his antagonist's credit than to his, still the fact that his career as an admiral was free from disaster shows that his seamanship must have been at least respectable. Although at the Restoration his sympathies were so little Catholic that he supported the policy of Clarendon, whose daughter Anne he secretly married in September, 1660, publicly acknowledging the union in the December following, he soon thereafter became a convert to Romanism, and in 1672, in opposition to the expostulations of his brother, openly avowed his change of faith. Anne Hyde having died in 1671, he also persuaded his brother to defy the wishes of both Houses of Parliament by permitting him in 1673 to marry the Catholic princess Mary of Modena. On account of the Test Act, passed in this year, he had been compelled to resign his office of admiral, and, although the marriage in 1677 of his daughter Mary to William, prince of Orange, somewhat allayed the distrust with which he was regarded, it was deemed advisable, on the discovery of the Popish plot in 1679, that he should retire for a time to Brussels. Afterward he was appointed lord high commissioner to Scotland, where his arbitrary bigotry found congenial employment in the persecution of the Covenanters; but in 1684 Charles ventured to dispense in his case with the Test Act, and restored him to his office of admiral.

The influence of the loyal enthusiasm which surrounded the last days of Charles in 1685 was felt in the calm acquiescence with which the nation witnessed James' succession to the throne on February 6th, and his coronation on April 23, 1686. The trust awakened by his promise to preserve the government, both in church and state as by law established, was indeed almost immediately rudely shaken by his public celebration of mass, by his prohibition of preaching against Catholicism, and by his appointment of Catholic officers to the army; but that the good will, at least, of the Commons was still strong was manifested by the grant of a revenue of two millions, and by the enactment of severer measures against treason. If the loyalty of the nation had begun to waver, it was also for the time strengthened by the premature and headstrong attempts at rebellion by Argyll in Scotland, and Monmouth in England. The renewal of the Covenanting persecutions had, however, branded the name of James with the hatred of the

Scottish people, and the butchery of the Bloody Assizes, which in England followed the discomfiture of Monmouth, left behind it a widespread horror, the repression of which only wrought effects on the mind of the nation the deeper and more ineffaceable. But James was too intent on his one aim—the establishment of irresponsible despotism—to scrutinize or consider the indirect consequences of his acts. In that aim was necessarily involved the restoration of Popery, because James was a Papist, but happily the accidental prominence given to this secondary and subordinate aim made the other impossible of success. In his imprudent zeal to accomplish his purpose, James outran the wishes even of Rome, but that was because the purpose which to the one was secondary was to the other primary. James required both a large standing army, and freedom from the control of parliament; but for these ends a foreign source of money supply was at first necessary, and this he could only obtain by an arrangement which, while it was unpalatable to himself and loathsome to the nation, was far from acceptable to the pope—namely, by becoming the temporary vassal of Louis of France, whose ambitious designs, notwithstanding his intense and virulent Catholicism, had awakened the jealousy of Rome. Besides, many of the individual acts of James were prompted by the Jesuits, with whom the pope was then at feud. The progress of James' ill-starred design was marked by clear and well-defined steps. While all England was shocked by the cruelties following the revocation by Louis of the edict of Nantes, James resolved to demand the repeal of the Test Act, and when this was refused by parliament he fabricated, by means of corrupted judges, a semblance of legal sanction for his disregard of its provisions, and not only encamped an army on Hounslow Heath, chiefly officered by Catholics, but manifested his determination that henceforth to be a Catholic should be a recommendation and not a bar to the highest offices of state, by creating Father Petre and five Catholic peers privy councilors.

An appearance of liberality was indeed given to his policy by a declaration of indulgence to Protestant dissenters, but this only quickened suspicion as to his ultimate purpose. Moreover, while a commission was illegally appointed to restrain the discussion of political subjects by the clergy, the publication of Romanist sentiments was freely permitted, monasteries and Catholic schools were being rapidly augmented, and an attempt was made to swamp the Protestantism of the universities by conferring the principal dignities as they became vacant on Catholics. This final step, and a second declaration of indulgence of April, 1688, which contained a provision for the prosecution of those clergymen who might refuse to read the declaration in their pulpits, dissipated the last atoms of veneration in the minds of the Tories for the divine right of the king; and after the birth of a son to James in May of the same year nearly every party in the state was prepared to support the invitation to William of Orange to aid in the restitution of the liberties of the country. The discussion of the motives which induced William to accept this invitation, and the results which followed his landing in England, belong properly to the article on WILLIAM III. James, finding the bulwarks of despotism crumbling around him, after refusing the advice of a council of lay and temporal peers to open negotiations with William, made a pretense of yielding only to gain time to escape, and by his cowardly flight, which he persevered in even after being intercepted and brought back to London, rendered the coronation of Mary and William indispensable. All hope in England was for the time lost, and as by his action on the Test Act he had alienated the sycophantic estates of Scotland, the rising in the Highlands afforded no permanent benefit to his cause; but in Ireland it might be possible for him still to enjoy, though in diminished luster, the glories of sovereignty until he should be restored to his wider dignities. If his policy toward Ireland had been dictated by the position in which he was now placed, it failed of its purpose, for even before the arrival of William he discovered that he had to fight his way to dominion, and finally, notwithstanding the aid of French troops, his craven irresolution in the face of danger lost him the battle of the Boyne, July 1, 1690, after which he made a hurried escape to France. An expedition to England in his favor was projected by Louis in 1692, but was frustrated by the defeat of the French fleet off Cape La Hogue on May 17, and another invasion planned to follow on the success of an assassination plot on February 10, 1696, was foiled by the discovery of the treachery. James died at St. Germain, in September, 1701.

JAMES, or, in full, JAMES FREDERICK EDWARD STUART, prince of Wales, called by his adherents James III. of England, but better known as the Pretender, was the son of James II. and Mary of Modena, and was born in St. James' Palace, London, June 10, 1688. The general opinion prevailing at the time of his birth that he was a supposititious child seemed to be confirmed by a variety of circumstances, but it has been completely overthrown by undoubted facts. Shortly before the flight of the king to Sheerness, the infant prince along with his mother was sent to France, and afterward he continued to reside with his father at the court of St. Germain. On the death of his father he was immediately proclaimed king by Louis XIV. of France, but a fantastic attempt to perform a similar ceremony in London so roused the anger of the populace that the mock pursuivants barely escaped with their lives. A bill of attainder against him received the royal assent a few days before the death of William III. in 1702, and the Princess Anne, half-sister of the Pretender, succeeded William on the throne. An influential party still, however, continued to adhere to the Jacobite cause; and an expedition planned in favor of James failed of success chiefly in all probability because his falling ill of measles, on the eve of its departure, enabled the English to assemble so powerful a fleet as rendered disembarkation inadvisable. A rebellion in the Highlands of Scotland was inaugurated in September, 1715, by the raising of the standard "on the braes of Mar," and the solemn proclamation of James Stuart, "the Chevalier of St. George," in the midst of the assembled clans, but its progress was arrested in November by the indecisive battle of Sheriffmuir, and it was practically extinguished a few weeks afterward by the surrender of Preston. Unaware of the gloomy nature of his prospects, the Chevelier landed in December at Peterhead, and advanced as far south as Scone, accompanied by a small force under the Earl of Mar; but, on learning of the approach of the duke of Argyle, he retreated to Montrose, where the Highlanders dispersed to the mountains, and he embarked again for France. A Spanish expedition sent out in 1718 under the direction of Alberoni was scattered by a tempest, only two frigates reaching the appointed rendezvous in the island of Lewis. In 1719 James was married at Avington to the Princess Clementina of Poland, by whom he had two sons, Charles Edward and Henry, afterward Cardinal York. His licentious habits soon led to a separation from his wife, and his indolence and irresolution having completely unfitted him for the *rôle* of aspirant to the English throne, the hopes and affections of his adherents were gradually transferred to his son Charles Edward, of whose career an account is given under the heading CHARLES EDWARD. James spent the remainder of his years at Rome, where he was regarded with very little esteem by the pope and the populace. For several of the last years of his life the Chevalier was so infirm in health that he was unable to leave his bed chamber. He died at Rome, January 2, 1766, and was interred in the Church of St. Peter's.

JAMES, GEORGE PAYNE RAINSFORD, English novelist, was born in London, in 1801. He began to write early, and had, according to his own account, composed the stories afterward published as *A String of Pearls* before he was seventeen. Contributing plentifully to newspapers and magazines, he came under the notice of Washington Irving, who is said to have encouraged him to produce (1822) his *Life of Edward the Black Prince*. His next attempt was *Richelieu*, which was finished in 1825, and was well thought of by Sir Walter Scott (who apparently saw it in manuscript), but was not brought out till 1829. For thirty years the author of *Richelieu* continued to pour out novels of the same kind, though of varying merit. The full list of his works in prose fiction, verse narrative, and history of an easy kind includes between seventy and eighty items, most of them being three-volume novels of the usual length. The best examples of his style are perhaps *Richelieu*, 1829; *Philip Augustus*, 1831; *Henry Masterton*, 1832; *Mary of Burgundy*, 1833; *Darnley*, 1839; *Corse de Léon*, 1841; *The Smuggler*, 1845. His poetry does not require special mention, nor does his history, though for a short time in the reign of William IV. he held the office of historiographer royal. After writing vigorously in all these styles for about twenty years, James in 1850 went to America with his family. He was appointed consul at Richmond, Va., and held that post from 1852 to 1858. In September of the latter year he was appointed to a similar post at Venice, where he died May 9, 1860.

JAMES, JOHN ANGELL (1785–1859), preacher and author, was born at Blandford, Dorsetshire, England.

JAMESON, ANNA, was born in Dublin in 1794. Her first literary production, the merits of which she little appreciated, did not make its appearance until after her marriage with Mr. Robert Jameson, a barrister, in 1825, when it was advertised by a friend under the title of a *Lady's Diary*, and ultimately published by Mr. Colburn as *The Diary of an Ennuyée*. Mrs. Jameson's marriage was not a happy one; but, if not more unfortunate than many of her sex in this form of trial, she set the example of a rare discretion under it. In 1829 Mr. Jameson was appointed puisne judge in the island of Dominica. It was decided to be impracticable for her to accompany him, and meanwhile Mrs. Jameson visited the Continent again with her father. Traces of this journey appear in *Visits and Sketches at Home and Abroad*. The first work in which her powers of original thought became embodied were her *Characteristics of Shakespeare's Women*, which appeared in 1832. In 1833 Mrs. Jameson paid her first visit to Germany, the literature and art of which country may be said to have then first roused the curiosity of English minds.

It was in 1836 that Mrs. Jameson was summoned by her husband to join him in Canada. He failed to meet her, even by a letter, at New York, and she was left to make her way alone at the worst of seasons to Toronto. After six months' experiment she felt it useless to prolong a life far from all ties of family happiness and opportunities of usefulness. Before leaving, she undertook a journey to the depths of the Indian settlements in Canada; she explored Lake Huron, and saw much of emigrant and aboriginal life unknown to travelers, which she afterward embodied in her *Winter Studies and Summer Rambles*. She returned to England in 1838. It was at this period that Mrs. Jameson first devoted her attention to the subject of art. She began by making careful notes of the chief private collections in and near London which had hitherto received no systematic description. This *Companion to the Private Galleries* was soon followed by the *Handbook to the Public Galleries*. These works led on to those by which her literary career has been specially distinguished—her series of *Sacred and Legendary Art*. In her later years she took up a succession of subjects all bearing on the same principles of active benevolence, and the best ways of carrying them into practice. Mrs. Jameson died in March, 1860.

JAMESON, or JAMESONE, GEORGE, a Scotch portrait painter, was born at Aberdeen about 1587 and died in 1644.

JAMESON, ROBERT, regius professor of natural history in the university of Edinburgh, was born at Leith, Scotland, in 1774 and died in 1854.

JAMESTOWN, an incorporated village of Chautauqua county, N. Y., at the outlet of the Chautauqua Lake, seventy miles from Buffalo. It is at the junction of several railroads and has considerable manufactures of woolen and alpaca goods, furniture and agricultural implements, and a number of mills, foundries and machine shops. Jamestown also possesses three national banks, two daily and five weekly newspapers, ten churches and good schools. Its population in 1900 was 22,892.

JAMESTOWN, a ruined town of James City County, Va., on the James River, is of historical interest as the scene of the first permanent English settlement in America. In 1607 three ships with 105 emigrants landed here and built a town, which, in honor of the then reigning king, they named Jamestown. Nothing now remains but an old ruined mill and a church to mark the spot of the old town.

JÁMI. Núruddín 'Abdurrahmán ibn Ahmed (1414–1492), called el Jámí from his birthplace Jám in Khorásán, was the last great poet and mystic of Persia. See PERSIA.

JAMIESON, JOHN (1759–1838), author of the *Scottish Dictionary*, was born in Glasgow.

JAMNIA, the Greek form of the Hebrew name Jabneel or Jabneh, the modern Arabic *Yebna*, a city of Palestine, on the border between Dan and Judah, situated thirteen miles south of Jaffa, and four miles east of the seashore.

JAMRUD, a ruined fort in Pesháwar district, Punjab, India, situated at the mouth of the Khyber Pass, 1,670 feet above sea-level.

JAMS AND JELLIES are conserves of the pulp and juice of succulent and juicy fruits prepared by boiling with sugar. They differ from each other only in the fact that jam is a thick, pulpy, opaque preparation, sometimes of the entire fruit—rind, pulp, and kernel—and sometimes of fruits only partly broken, as in the case of black currant jam, while jellies are pure transparent gelatinous preparations of juices alone. The preparation of these preserves was formerly a purely domestic art; but of recent years manufactures of very large dimensions have sprung up for the preservation of many of the commoner fruits, as an example of which the marmalade trade may be cited, marmalade being simply a form of jam.

JAMU, or JUMMOO, a town in Kashmír state, Punjab, India, headquarters of Jamu province, on the Távi, a tributary of the Chenab, among the mountains of the outer Himálayan range. The town and palace stand upon the right bank of the river; the fort overhangs the left shore at an elevation of 150 feet above the stream. The lofty whitened walls of the palace and citadel present a striking appearance from the surrounding country. Population, about 8,000.

JANESVILLE, the capital of Rock county, Wis., is situated on the Rock river, ninety-one miles northwest of Chicago. The water power at this point is improved by an extensive system of dams, and furnishes motive power for a number of cotton, woolen and flouring mills. Janesville has manufactures of agricultural implements, carriages, furniture, boots and shoes, and cigars, and contains two national banks, nine hotels and numerous churches and schools. The city was incorporated in 1853; it is built principally of brick and is lighted with gas. It stands at the junction of three railroads, and is an important shipping and distributing point. Population (1900), 13,185.

JANGIPUR, or Jaáhngírpur, the chief town of the subdivision of the same name in Murshidábád district, Bengal, situated on the left bank of the Bhágirathí. The town is said to have derived its name from having been founded by the Mughal emperor, Jahángir.

JANIN, Jules Gabriel, a remarkable instance of a certain kind of critic, was born at St. Étienne, the great manufacturing town of the department of the Loire, December 24, 1804, and died at his house, near Paris, in June, 1874. He betook himself to journalism very early, and worked on different papers, the *Figaro*, the *Quotidienne*, etc., until, in 1836, he fixed himself as dramatic critic of the *Débats*. Long before this, however, he had made a considerable literary reputation, for which, indeed, his strange novel, *L'Âne Mort et la Femme Guillotinée* (1829), would have sufficed. *La Confession*, which followed, was less remarkable in substance, but even more so in style; and *Barnave*, in 1831, sustained the literary reputation of the author, though the violent attacks it contained on the Orleans family did not, when they were taken with his subsequent conduct, increase his reputation for consistency. From the day, however, when Janin became the theatrical critic of the *Débats*, though he continued to write books indefatigably, he was to most Frenchmen a dramatic critic, and nothing more.

JANINA, Jannina, Joannina, or, as the name is frequently written according to its actual Albanian pronunciation, Yanina, a town of European Turkey in southern Albania, or—to retain the ancient designation—Epirus. The position of Janina is strikingly picturesque. At the foot of the gray limestone mass of Mount Mitzekeli (1,500 ft.), which forms part of the fine range of hills running north from the Gulf of Arta, there lies a valley (the Hellopia of antiquity) partly occupied by a lake; and on the slopes of a slight eminence, stretching down to the western shore, stands this town of St. John. It has greatly declined from the state of barbaric prosperity which it enjoyed in the beginning of this century, when it was the seat of Ali Pasha, estimated to have from 30,000 to 50,000 inhabitants.

JANIZARIES, or Janissaries (Turkish *Yeñi*, new, and *askari*, soldier). The origin of the Janizaries was in 1360, when the Sultan Amurath I. first formed a bodyguard from among his Christian captives. This was the earliest standing army in Europe, and like most proselytes the Janizaries became even more fanatical than the genuine Osmanli. But from being the Sultan's slaves they became his masters and murdered, deposed and appointed successive rulers at their pleasure. In 1826 the Sultan Mahmoud II. began to reorganize the army and the Janizaries rose in rebellion. After a three days' struggle, during which 20,000 of their number were killed, the Janizaries as a body were annihilated.

JANSEN (Jansenius), Cornelius, bishop of Ypres, and the author of the celebrated *Augustinus*, was born of humble Catholic parentage, at Acquoy or Ackooi, a small village near Leerdam, and seven miles to the northeast of Gorcum, Holland, on October 28, 1585. After completing his preliminary studies at Leerdam and Utrecht, he, in 1602, proceeded to Louvain, where he studied for a short time at the Jesuit college. Having graduated in philosophy at Louvain in 1604, Jansen went to Paris, where he remained for some time, supporting himself by teaching; afterward he accompanied Vergerius to Bayonne, the native place of the latter, where they spent several years together, Du Vergier ultimately becoming canon of the cathedral, and Jansen head of the episcopal college. Every available moment of their time was devoted to the study of the fathers, and especially of Augustine. In 1617 Jansen returned to Louvain, whither he had been urgently summoned by Jansonius, who greatly desired to have there a man of real learning and energy who should be able to counteract the growing influence of the Jesuits. On his arrival he undertook the principal charge of the newly founded college of St. Pulcheria. In 1619 he became doctor in that faculty. In 1624 and again in 1626, he undertook a journey to Spain, on behalf of the university, with reference to certain encroachments of the Jesuits on its exclusive privileges; in the second of these missions he was successful, the members of the Society of Jesus in the Low Countries being ordered to continue to observe the restrictions which had been laid upon them in 1612. In 1630 Jansen was made regius professor of Biblical exegesis; and, in the same year, in connection with the recent introduction of the Reformed religion into Bois-le-Duc, he entered upon a controversy about Protestantism with the learned Voetius, the issue of which conclusively showed that he had grievously underestimated his adversary's strength. In 1635 he published a pseudonymous work, embodying an argument and remonstrance against the policy of France in its recent alliance with the Protestant Gustavus Adolphus. For this supposed service to Spain he was rewarded in 1636 with the bishopric of Ypres. He was preparing for the press his great work upon St. Augustine, which had occupied him for twenty-two years, when he was cut off by sudden illness on May 6, 1638.

JANSENISM. The *Augustinus* of Jansen, published in 1640, is a work in three folio volumes. The first of these is devoted to an historical exposition of the Pelagian and Massilian (semi-Pelagian) heresies; the second sets forth the Augustinian doctrine as to the state of innocence and the fallen state; while the third treats, in ten books, of the grace of Christ the Saviour. The sting of the work is to be found mainly in the epilogue, which draws a parallel, in various particulars, between the errors of the Massilians and those "more recent ones," the Jesuits being referred to. In 1641 the reading of the books, thus flung into the arena of theological controversy and ecclesiastical intrigue, was prohibited by the Inquisition; no opinion, however, was pronounced as to its doctrine, and the counter-agitation of the Jesuits in relation to it was condemned as inconsistent with the spirit of the papal injunctions already referred to. But the dispute did not admit of being thus quietly repressed, and accordingly, in 1643, the bull *In eminenti* of Urban VIII. was published, renewing and confirming the constitutions of Pius V. and Gregory XIII., as well as the decrees of Paul V. and of himself, and forbidding the reading of the *Augustinus*, not only on the ground that its appearance had not been sanctioned, but also because it contained various errors. This bull encountered a very general resistance in the Netherlands, on the part both of the university of Louvain and of the clergy at large; but ultimately, through the intervention of the Spanish government, it was accepted (1651), subscription to it, however, not being insisted on. At the Sorbonne also it was badly received, and the dissatisfaction it had caused in France found expression in the *Apology for Jansen* by Arnauld in 1644, which was followed by a second in 1645. The strength of these *Apologies* lying largely in the fact that no particular doctrines of Jansenius had been condemned as heretical in the papal bull, the Jesuits, inflexible in their determination to secure the effectual condemnation of a book which told so powerfully against their distinctive theology, immediately set about obviating this weakness in their attack, and various attempts were accordingly made to formulate, in the shape of definite propositions, the heresy which they believed to exist.

The pope long resisted the pressure with which he was urged to pronounce upon these theses in an adverse sense; it is easy to understand why he should steadily have inclined to the old and simple expedient of enjoining silence upon disputants on either side of the controversy; for, if the Jansenist propositions had a Calvinistic ring about them, there was no denying that they also admitted of an Augustinian and therefore presumably of an orthodox interpretation. At length, however (May, 1653), Innocent X. in the bull entitled *Cum occasione impressionis libri* pronounced the first four points heretical, while the fifth was declared to be false, with the addition that, if it was intended to convey the meaning that Christ died only for the elect, it was impious and blasphemous as well as heretical. This bull was accepted and promulgated in France and the Netherlands with the royal consent, and the victory of the Jesuits was quite decisive. The commotion which ensued called forth in January, 1656, the first and second of the *Provincial Letters* of Pascal, but these brilliant controversial efforts did not suffice to avert the expulsion of Arnauld from the Sorbonne (January 31, 1656). In the following year the theological faculty of Paris drew up a formula avowing full acceptance of the bull of Alexander VII., in which it had been specifically declared that the five propositions contained *de facto* Jansenist error. This document, sanctioned by the king in 1661, the clergy and all inmates of conventual establishments were called upon to sign, all who refused being treated as heretics. The leading Jansenists were compelled to go into hiding, and the nuns of Port Royal were subjected to imprisonment and other harsh treatment. Many of the clergy, with whom were four bishops, persisted in their refusal to sign, until at last, in September, 1668, the compromise called the "peace of Clement IX." was arranged, in virtue of which, by the omission of a single word ("purement"), assent was no longer required to the proposition that Jansen had actually taught the five propositions in a "purely" heretical sense. The respite from controversy and persecution thus secured was not of long duration. The Jesuits were quite unable to make a moderate use of the power of which they were now so fully possessed. Arnauld was driven into Holland. In 1705 a bull was obtained from Clement XI. in which the heretical character of Jansen's teaching, in Jansen's sense, was authoritatively asserted, and thus the peace of Clement IX. was destroyed. This measure ultimately led, in 1710, not only to the breaking up of the establishment at Port Royal, but also to the destruction of the very buildings. The result was to divide the French Church into two parties, the acceptants or constitutionists, and the appellants or anti-constitutionists; but again the Jesuit influence was able to secure the ultimate defeat (1728) of Noailles and his party, and in 1730 the bull was formally registered as the law of the kingdom. Oppressed Jansenism now changed its method of defense. Reports of miracles wrought in the cemetery of St. Medard, Paris, at the grave of François de Paris, a young Jansenist deacon who had died in 1727, began to be circulated; and the spot became a pilgrimage center daily visited by thousands of fanatics. It was in vain that the place was walled up; portions of earth which had been taken from the grave were equally efficacious, and the number of convulsionary prophets of coming ruin to the state and church continued to increase. Repression by imprisonment and other violent means was vainly attempted; but as the novelty of the movement wore off the excitement gradually died down; and after the middle of the eighteenth century, the appellants or Jansenists of France ceased to make any figure in the public view.

JANSSENS, or JANSENS, VAN NUYSSEN, ABRAHAM (1567–1632), painter, was born at Antwerp.

JANSSENS, or JANSENS, VICTOR HONORIUS (1664–1739), painter, was born at Brussels.

JANUARIUS, ST., or SAN GENNARO, the patron saint of Naples, according to the Roman Breviary, was bishop of Benevento, and flourished toward the close of the third century after Christ. On the outbreak of the persecution by Diocletian and Maximian, he was taken to Nola and brought before Timotheus, the governor of Campania, on account of his profession of the Christian religion. After he had withstood various assaults upon his constancy, he was at last sentenced to be cast into the fiery furnace, through which he passed wholly unharmed. On the following day, along with a number of fellow martyrs, he was exposed to the fury of wild beasts, which, however, contrary to their nature, laid themselves down in tame submission at his feet. Timotheus, again pronouncing sentence of death, was struck with blindness, but immediately healed by the powerful intercession of the saint, a miracle which converted nearly five thousand men on the spot. The ungrateful judge, only roused to further fury by these occurrences, caused the execution of Januarius by the sword to be forthwith carried out. The body was ultimately removed by the inhabitants of Naples to that city, where the relic became very famous for its miracles, especially in counteracting the more dangerous eruptions of Vesuvius. His clotted blood, preserved in a glass vial, even to this day, is wont to liquefy and bubble up as if but recently shed whensoever it is placed within sight of the martyr's head. So far the Breviary. This liquefaction of the blood, which is brought about at least twice a year, on May 1 and on September 19, the day assigned to this saint in the Roman calendar, is a miracle the recurrence of which is observed by believing Neapolitans on each occasion with various festivities extending over a whole week.

JANUARY, the first month in our present calendar, consists of thirty-one days. It was, however, not the the first month of the year in the British Isles till the reformation of the calendar was made in 1752, when the legislature by an act passed in the preceding year, altered the mode of reckoning time from the Julian to the Gregorian style. At this period it was directed that the legal year, which had commenced in some parts of the country on March 25, and in others with January, should thenceforward be appointed to begin always on the 1st of January. January derives its name from the god Janus, who had two faces looking in opposite directions, and Macrobius states that it was dedicated to him because, from its situation, it might be considered to be retrospective to the past and prospective to the opening year.

JANUS, a Roman god, after whom the month of January was named. His temple was open in war and closed during peace, and the ceremony of closing it for the third time in Roman history was performed by Augustus, 29 B.C., when he had established his authority over the whole empire. This temple, which was in reality only an arch or gateway, facing east and west, stood near the forum. When most of the Roman gods were merged in Greek divinities, Janus retained his native character. Amid the obscurity that hangs over the genuine Roman religion, it is difficult to determine the nature and origin of Janus.

JAPAN. The empire of Japan consists of a long chain of islands, separated from the eastern coast of Asia by the Seas of Japan and Okhotsk. It commences with the Kurile Islands, and descends in a southwesterly direction to the Loochoo group, to which the Japanese Government reasserted their claim in 1875. The southern portion of the island of Saghalien was ceded to Russia in exchange for the Kuriles. The whole empire is called by the natives *Dai Nippon*, or "Great Japan;" but *Nippon* or *Nihon* is often employed alone. *Nippon* means literally "sun's origin," *i.e.*, the land over which the sun first rises, and thus denotes the position the empire occupies in the extreme East. The principal islands may be enumerated as follows:—

1. The main island, which does not bear any special name. In many of the older geographical works it is stated that *Nippon* is the distinctive appellation of this one island, but by the Japanese themselves the name is applied only to the whole country.
2. Kiushiu (lit., "the nine provinces").
3. Shikoku (lit., "the four provinces").
4. Yezo.
5. Sado.
6. Tsushima.
7. Hirado (often wrongly written Firando).
8. Awaji.
9. Ôshima ("Vries Island"), and the chain adjacent to it, terminating with Hachijô (misspelt on charts Fatsisio).
10. Iki, with several smaller isles.
11. The Oki group.
12. The Gotô group.
13. The Bonin group.
14. The Riukiu (Loochoo) group.
15. The Kurile group (Chijima; lit., "the thousand Islands").

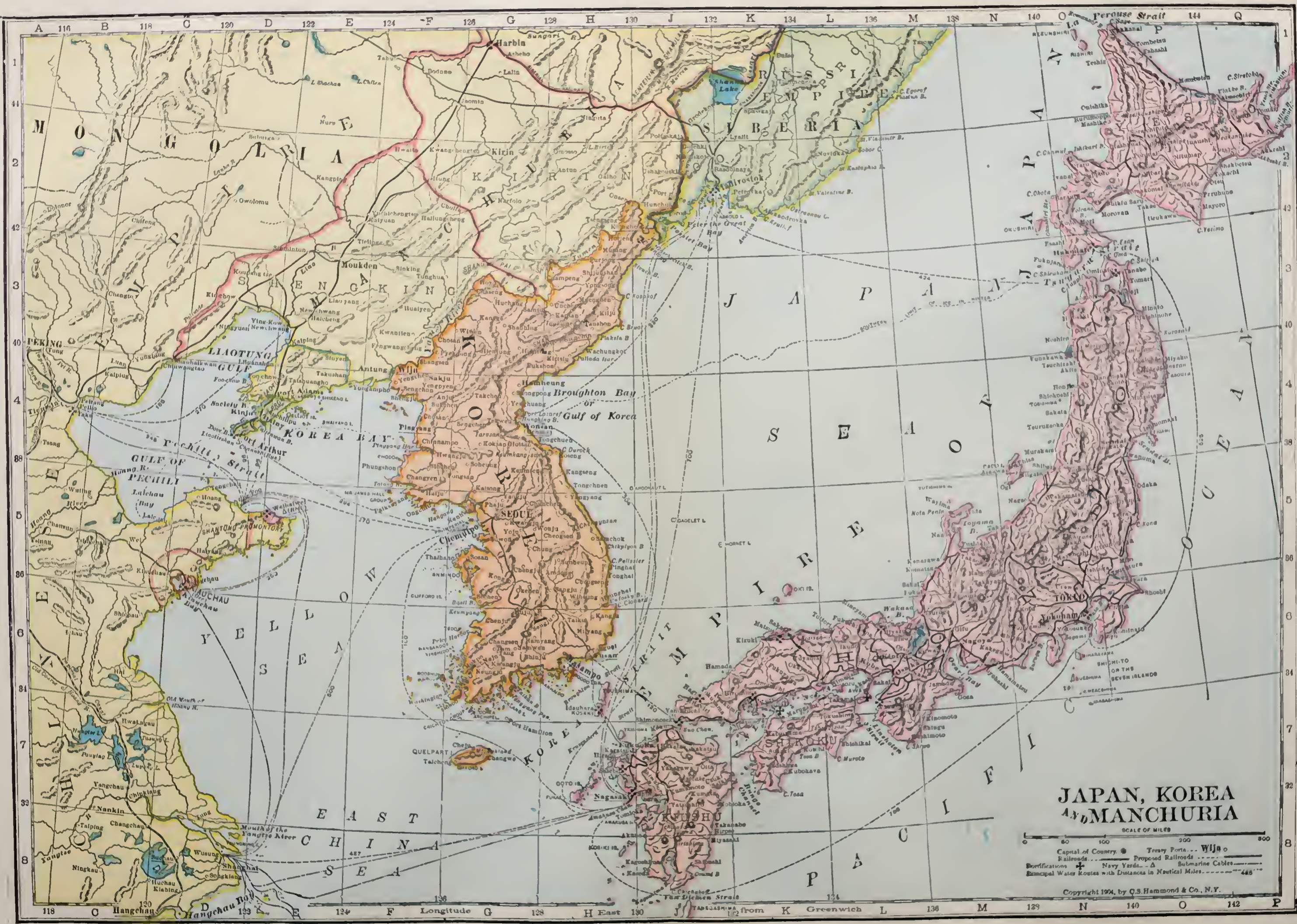
Owing to the lack of reliable surveys, it is exceedingly difficult to form a correct estimate of the area of the Japanese empire. A few years ago the government instituted surveying operations under the direction of skilled foreign engineers, and an ordnance map of the city of Tôkiô has already been prepared and published; but any correct calculation of the size of the whole country can hardly be obtained for some years to come. In a work on general geography published a few years ago by the Education Department at Tôkiô, the area of Japan is stated to be 24,780 square *ri*, which measurement, taking the linear *ri* as equal to 2.45 English miles, gives a total of about 147,655 miles.

For purposes of administration the whole of the empire except the *Hok'kaidô* was divided in 1872 into three cities (*fu*) and seventy-two prefectures (*kem*). The three cities are Yedo, Ôzaka, and Kiôto. In 1869 Yedo also received the name of Tôkiô, or "eastern capital," as opposed to Saikiô (the new name for Kiôto) or "western capital." This was in consequence of the removal of the emperor's court from his old capital to Yedo. It may, however, be here remarked, that, while the Japanese invariably speak of *Tôkiô Fu*, "the city of Tôkiô" they use the name *Kiôto Fu*, "the city of Kiôtô," and not, as might have been supposed, *Saikiô Fu*. The limits of the prefectures (*ken*) were irrespective of the boundaries of the provinces. There were originally seventy-two, but a gradual process of amalgamation has considerably reduced the list; and in August, 1876, a government notification fixed the prefectures at only thirty-five.

The total number of islands in the Japanese group exclusive of the four main ones, is stated to be over four thousand. Many of these are mere barren rocks, uninhabited and uncultivated. Others, again, are of considerable size and exceedingly fertile, particularly the countless islets in the *Suwo Nada*, commonly known to Europeans under the name of the "Inland Sea," lying between the main island on the north and the islands of Shikoku and Kiushiu on the south. The whole coastline, too, is dotted with islands and rocks of all sizes. Ôshima, also called Vries Island, at the mouth of the Bay of Yedo, is one of considerable importance. It has many inhabitants, and its volcanic soil is fairly productive. It is the most northerly of a chain which extends as far south as 27° N. latitude. The Bonin group, termed by the Japanese the Ogasawara Islands, lies far out at sea, to the south of the entrance of Yedo Bay; it consists of two large islands, separated from each other by fifty miles of sea, and a host of islets. The Japanese Government reasserted their sovereignty over the Bonins in 1878. The Kurile Islands are merely a chain of barren rocks, and the few inhabitants are chiefly occupied in the fisheries and in hunting the sea-otter. Due south from the province of Satsuma lie several minor groups, terminating with the Riukiu Islands. The Gotô group (lit. "the five islands") extends in a westerly direction from the province of Hizen, in Kiushiu, to which it belongs.

The bays along the coast are often of considerable size. The Japanese, strange to say, have no names for either their bays or their straits, the appellations found on maps and charts having been given by European navigators. Yedo Bay is, perhaps, the best known to foreigners, but Sendai Bay (on the east coast) and that running up to the north of the island of Awaji, and commonly called Ôzaka Bay, are also famous. Owari Bay, in the province of that name, is of considerable size. The Bay of Kagoshima, in the province of Satsuma, is long and narrow. The straits best known to foreigners are the Straits of Tsugaru (often miscalled Saugur in maps), which separate Yezo from the northern portion of the main island; the Straits of Akashi and of Idzumi, near the island of Awaji, at the eastern entrance of the "Inland Sea;" and the Straits of Shimonoséki, at the extreme western end of that sea, separating the main island from Kiushiu. The attack on Shimonoséki, in 1864, by an allied squadron of English, French, Dutch, and American vessels, in retaliation for injuries inflicted upon foreign shipping passing through the straits by the batteries erected by the lord of Chôshiu (in which province Shimonoséki is situated), is a matter of historical note.

The number of harbors and trading ports called by the natives *ô-minato* ("large harbors") is stated to be fifty-six, but many of these would, no doubt, be inaccessible to foreign vessels of heavy tonnage. They are, however, admirably adapted for the accommodation of coasting junks and fishing craft, and these vessels have no lack of places of refuge in heavy weather. In many instances the entrances are blocked by one or more small islands or rocks, which render the anchorage within even more secure. In Yezo the port of Matsumae is the one best known. The Bay of Yedo abounds with harbors, some being situated within the mouths of the rivers. The harbors on the northwest coast of the main island are also numerous, and each of the islands Tsushima, Iki, and Sado possesses one.



JAPAN, KOREA AND MANCHURIA

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Japan, as might reasonably be expected in a country where volcanoes are so numerous, is very hilly; and in some districts there are many mountains of considerable height. The most extensive plains are those of the Kuantô and Echigo, and the north of Ôshiu. The provinces of Mikawa, Mino, and Owari are also very flat. Half-way between Tôkiô (Yedo) and Kiôto lies the great watershed of the east of Japan, the table-land of Shinano, elevated some 2,500 feet above the level of the sea. The ridges around or forming part of it are very lofty, particularly those of the province of Hida. The plain of Yedo lies to the east of this table-land, about 1,800 feet below, while to the north the hills gradually slope away to the province of Echigo. Another range of considerable height runs due north from Aidzu to Tsugaru, thus dividing the old provinces of Ôshiu and Déwa. The province of Kai is almost entirely surrounded by mountains, and the hill scenery in Kishiu and near Kiôto is exceedingly fine. The mountain best known to foreigners is Fujisan—commonly, but most erroneously, termed Fusiyama or Fusi-no-yama in geographical works. It rises more than 12,000 feet above high-water level, and is in shape like a cone; the crater is 500 feet deep. It stands on the boundary line of the three provinces of Kai, Suruga, and Sagami, and is visible at a considerable distance seaward. It is regarded by the natives as a sacred mountain, and large numbers of pilgrims make the ascent to the summit at the commencement of summer. Though now apparently extinct, it was in former times an active volcano, and Japanese histories mention several very disastrous eruptions. The last of these occurred in 1707, when the whole summit burst forth into flames, the rocks were shattered and split by the heat, and ashes fell even in Yedo (about sixty miles distant in a direct line) to a depth of several inches. There are several active volcanoes in the country, that best known to foreigners being Asama-yama. This mountain is 8,500 feet in height. The earliest eruption of which records now exist seems to have taken place in 1650; after that the volcano was only feebly active for one hundred and thirty-three years, when there occurred a very severe eruption in 1783. Even so lately as 1870 there was a considerable emission of volcanic matter, at which time, also, violent shocks of earthquake were felt at the treaty port of Yokohama. The crater is very deep, with irregular rocky walls of a sulphury character, from apertures in which sulphurous fumes are constantly sent forth.

The rivers of Japan, although very numerous, are in no case of any great length. This, of course, is easily explained by the fact that the islands are narrow and hilly. The longest and widest river is the Tonégawa, which rises in the province of Kôdzuké, and flows due east to the Pacific, throwing off, however, at Sékiyado in Shimôsa, a branch that flows into Yedo Bay, near the capital. The length of the Tonégawa is over 170 miles. At Sékiyado (which is a large and thriving river port) the water is no less than forty feet in depth, while a few hundred yards above that town foot-passengers can ford the stream without any great difficulty. Japan contains a large number of lakes, but only one—the Biwa Lake, in the province of Ômi—is worthy of special notice on account of its size. Its length is about fifty miles, and its greatest breadth about twenty miles. At a village called Katada, some ten miles from its southern extremity, it suddenly contracts to a breadth of only a mile and a half, after which it again slightly expands. This lake derives its name from a fancied resemblance to the *biwa* or Japanese lute; the scenery around it is particularly beautiful, and it is a favorite resort for sightseers from Kiôto. After Biwa may be noted the lakes of Chiuzenji, Suwa, and Hakoné, all of which lie far above the level of the sea. That of Chiuzenji is situated at the foot of the mountain called Nantai-zan, in the Nikkô range in the province of Shimotsuké. The scenery in its vicinity has given rise to the proverb that he who has not seen Nikkô should not pronounce the word "beautiful."

Japan is particularly rich in minerals, among which may be specially mentioned gold, silver, iron, copper, coal, and stone of various kinds. The gold was first discovered and melted in the year 749 A.D., during the reign of the emperor Shômu; it came from the department of Oda in the province of Ôshiu, and in the following year more was found in the province of Suruga. During the long period of Japan's seclusion from the rest of the world, the gold discovered remained in the country, and the amount augmented year by year; and this no doubt tended in a great degree to convey to the earlier foreign visitors the impression that the supply was far more abundant than was actually the fact. The quantity of bullion exported by the Portuguese during their stay in Japan (1550–1639) may be estimated at the least at £59,500,000, or an average of £660,000 ($3,300,000) yearly. From 1649 to 1671 the Dutch also exported large quantities, together with silver and copper, and the total value of gold and silver alone sent out of Japan during the sixteenth and seventeenth centuries may be estimated at nearly £103,000,000 sterling. The mode in which the Japanese work the gold ores nearly resembles Western methods. They understand perfectly the separation of even the smallest quantities of gold dust from stones and gravel by means of a system of washing and levigation. They do not, however, possess any good process for the separation of gold from silver, and hence all Japanese gold contains a greater or less proportion of the latter metal. Silver ore was discovered accidentally in the year 667 A.D., in the island of Tsushima; this ore produced the first Japanese silver metal, in the year 674. From 1400 to 1600 it was obtained and melted in Japan in far larger quantities than at the present time. It generally occurs in comparatively small quantities as an admixture in several copper and lead ores. Of the numerous iron ores to be found, the principal is magnetic iron ore, which forms the main basis of the Japanese iron industry. Loadstone was discovered in the year 713 in the province of Ômi. The exact date of the first manufacture of iron is unknown; it is certain only that the Japanese have worked their iron ores from the tenth century onward. The excellent temper of the Japanese sword-blades is well known. The most noted smiths formerly resided in the provinces of Sagami, Bizen, and Kiushiu, and in the neighborhood of Kiôto. Japanese legends assert that the first sword was forged in the reign of the emperor Sūjin (97–30 B.C.), but this statement is of course open to considerable doubt. Copper was, it was said, smelted in Japan for the first time in the year 698, and in the year 708 the first Japanese copper coin was cast. Since the tenth century enormous quantities of ore have been smelted, and this metal formed the chief trade of the Dutch and Chinese at Nagasaki from 1609 to 1858. It is perhaps the metal most commonly found in Japan, and is used for all kinds of household goods, doors to storehouses, ornaments, temple-furniture, mirrors, bronzes, smoking utensils, and current coinage. It is found and smelted in all parts of the country, particularly in the northern and western provinces, and its export figures considerably in the trade returns of the treaty ports during the past few years. As a rule Japanese copper is exceedingly free from the presence of injurious metals. After the year 1600 many bronze guns were cast in Japan, the workmanship being exceedingly good. Of other metals

Japan also produces lead, quicksilver, and tin. Coal is found in large quantities, particularly in Kiushiu, where the province of Hizen contains the well-known mines of Karatsu, and in the island of Takashima, near the treaty port of Nagasaki. Coal-fields also exist in the large northern island of Yezo. Nearly all the steamers plying between Japan and China coal at Nagasaki, where this trade attracts a good deal of enterprise. The numerous quarries throughout the empire afford large quantities of stone. Marble and granite are found principally in the provinces of Shinano, Mino, and Kôdzuké; freestone is also procured from Setsu and Idzu.

The climate of Japan, as might naturally be expected in view of the great length of the chain of islands, varies to a considerable extent in different localities. Thus we find that while the Riukiu and Bonin groups, lying close to the tropics, enjoy perpetual summer, the Kurile Islands in the far north of the empire share the arctic temperature of Kamtchatka. The climate is, on the whole, favorable for Europeans, although its frequent changes often prove trying to foreign residents. All the mountain ranges are wrapped deep in snow throughout the winter months; indeed, from many peaks snow never entirely disappears. Near Yokohama and Tôkiô the summer commences in May, but the heat only becomes oppressive in July and August, when the thermometer has been known to register 104° F. At the break-up of the summer there are heavy rains, which render the interior of the houses exceedingly damp and uncomfortable. After the winter there also occurs a short rainy season. The best months for making excursions into the interior are April and October, as the weather is then generally of mean temperature. Mention should here be made of the violent revolving storms, known as typhoons, which are closely related to the West Indian hurricanes and to the cyclones of the Indian seas. These generally occur in the months of July, August, or September; they invariably occasion great damage, not only to shipping, but also to property on land. Large trees are often snapped asunder like mere twigs, while the roofs and chimneys of foreign-built edifices suffer severely. As a rule one of these storms is experienced every year.

Destructive earthquakes have often taken place, while slight shocks are of frequent occurrence, several having been felt lately within the space of a few days. Japanese histories furnish numerous records of these phenomena. The physical structure of the islands alternates between mountain ranges, rugged upland regions, wide plains, and lands consisting of an endless succession of dale and down, level fields and small ridges. Yezo has not yet become thoroughly known to foreigners; but it possesses both hills and plains, the latter being in some cases very sandy. The northern portion of the main island of Japan is exceedingly mountainous, though large moors and uncultivated steppes are to be observed on all sides. To the southeast lies the wide plain of Yedo, remarkably fertile, and closed in by lofty ranges. From this away to the west the country is hilly in the center, with lower ground to the north and south; while in the large islands of Kiushiu and Shikoku the high ground is far in excess of the plain. The greater part of the cultivated land consists of rice-fields, commonly termed "paddy-fields." These are to be seen in every valley or even dell where farming is practicable; they are divided off into plots of square, oblong, or triangular shape by small grass-grown ridges a few inches in height, and on an average a foot in breadth—the rice being planted in the soft mud thus enclosed. Narrow pathways intersect these rice-valleys at intervals, and rivulets (generally flowing between low banks covered with clumps of bamboo) feed the ditches cut for purposes of irrigation. The fields are generally kept under water to a depth of a few inches while the crops are young, but are drained immediately before harvesting. They are then dug up, and again flooded before the second crop is planted out. The rising grounds which skirt the rice-land are tilled by the hoe, and produce Indian corn, millet, and edible roots of all kinds. Rice not only forms the chief food of the natives, but the national beverage, called *saké*, is brewed from it. In color the best *saké* resembles very pale sherry; the taste is rather acid. None but the very best grain is used in its manufacture, and the principal breweries are at Itami, Nada, and Hiôgo, all in the province of Setsu. Of *saké* there are many varieties, from the best quality down to *shiro-zaké*, or "white *saké*," and the turbid sort, drunk only in the poorer districts, known as *nigori-zaké;* there is also a sweet sort, called *mirin.*

The whole country is clothed with most luxuriant vegetation, except in some of the very hilly regions. The principal forests consist of *Cryptomeria* (Japanese cedar) and pine; the ilex, maple, mulberry, and giant camellia also abound. Some of the timber is remarkably fine, and the long avenues following the line of the different high roads afford a most grateful shade in summer. On the road from Tôkiô to the celebrated temples at the foot of the Nikkô hills is an avenue nearly fifty miles in length, of cedars and pines, some of the trees being fully fifty or sixty feet in height. The bamboo is especially useful and plentiful. Bamboo clumps are seen at frequent intervals in the rice-land; they line the river banks, and flourish equally well on the higher grounds; and it would be impossible to enumerate the multifarious purposes for which the cane is used. Of fruit-trees Japan possesses the orange, apple, walnut, chestnut, plum, persimmon, damson, peach, and vine. The fruit, however, is in most cases of quality far below that of European orchards. The tea-plant grows well in Japan, and tea forms one of the chief exports to foreign countries. The best leaf comes from the neighborhood of Uji, in the province of Yamashiro, to the southeast of Kiôto; but it is also largely exported from Yokohama, being produced in the fertile district in the east of the main island. The production of vegetable wax has also formed one of the principal industries of the island of Kiushiu, and the trees bearing the wax berries grow in great number on the hill slopes and around the edges of most of the cultivated fields (excepting rice-land) in the provinces of Hizen, Higo, Chikuzen, and Chikugo; in Satsuma, however, they are not so plentiful. The cotton-plant, introduced from India in 799, also thrives. The camphor-tree is found in most parts of the country, particularly in some of the higher regions; on account of its agreeable smell the wood is largely used in the manufacture of small cabinets and boxes. Among the minor vegetable products the sweet potato is particularly plentiful; it has several varieties, that known as the Satsuma potato being perhaps the best. Watermelons and gourds of various sizes and shapes thrive in the more sandy soil; and onions, carrots, small turnips, tomatoes, and beet-root are also cultivated. Beans and peas can also be grown. The climate of Yezo is said to be very favorable for both wheat and barley, and it is probable that in future years this large island may thus prove a source of considerable gain to the Japanese. In the island of Shikoku the indigo plant is found in abundance, and it also occurs in the eastern portion of the main island. The poppy is grown in Shikoku. In ferns and creepers of various kinds Japan is particularly rich, but her list of flowers is not very lengthy. The rose, peony, azalea, camellia, lotus, and iris are, however, to be seen.

As regards animal life Japan is well provided. The domestic animals comprise the horse, ox, dog, and cat; while the wilder tribes are represented by the bear, deer, antelope, boar, fox, monkey, and badger. In Yezo are found very large bears, so powerful as to be able to pull down a pony; in the central provinces of Shimotsuké and Shinano a small black species exists. The deer, antelope, and monkey are caught in nearly all the hilly regions throughout the whole country. Sheep do not thrive, although the hardier goat does—the reason assigned for this being that the "bamboo grass," with its sharp-edged and serrated blade, proves very deleterious as pasture. The Japanese horses, or rather ponies, are not very powerful animals; they stand on an average from thirteen hands two inches to fourteen hands two inches in height. They are thick-necked and rather high-shouldered, but fall off in the hind quarters. Large numbers of ponies are imported from China. The oxen are small but sturdy, and it is probable that, if the vast tracts of moorland at present lying uncultivated in the northern provinces were utilized for breeding cattle, substantial gains would be secured. The ordinary Japanese dog is very like the Eskimo dog, and is generally white, gray, or black in color. A few, however, are red-brown, and much resemble the fox; these are used by the hunters in the pursuit of game. There are several species of monkeys, and large numbers of these animals, taken in the hills of Kai and Shinano, are brought into the Tôkiô market, where they are sold for food; the flesh is white and very palatable. Wild birds are represented in Japan by the cormorant, the crane (*Grus leucauchen*, Jap. *Tan-chiyan*, is the national crane), wild goose (at least eight species), swan (*Cygnus musicus*), mallard, widgeon, teal (four species, including falcated teal or Yoshi-gamo), pheasant, woodcock, wood-pigeon, plover, and snipe. There are also found the bittern, the heron, and the white wader, commonly known as the "paddy-bird." Many varieties of domestic fowls exist, the tiny bantam being one of the most celebrated; there is also a large gamecock said to have been originally imported from Siam. Flocks of tame pigeons are to be seen in nearly every farmyard. The lark, swallow, and common sparrow are numerous. One of the most beautiful birds is the drake of the species generally called the "mandarin-duck" (*Aix galericulata*, Jap.), found on small streams in country districts. The Japanese fisheries are marvelously productive, and afford occupation to the inhabitants of the countless villages along the coasts. Herrings are caught off the island of Yezo, and the bonito, cod, sole, crab, and lobster are found in great plenty on nearly every part of the coast. In some of the rivers fair-sized salmon are caught; and there is also a fish very much resembling the trout. The *tai*, a large fish of the carp species, is esteemed a special delicacy. Eels, small carp, and fish of many other kinds are freely taken in nearly all the minor lakes and streams. The oyster is found in considerable quantities in the shallows at the head of the Bay of Yedo and elsewhere. To any student of zoölogy a visit to Japan would prove in the highest degree interesting.

The means of transport, although not exceptionally good, have yet improved considerably during the past few years. There were 3,635 miles of railway in Japan in 1901. Surveying operations have been going on for some years, with a view to the construction of other railways, and about 1,000 miles is building. The system of roads, too, is very fair, although in remote districts the work of supervision and repair is not done so carefully as is really necessary. Of the highways the Tôkaidô is that best known to foreigners. This is nearly 307 miles in length, and connects Kiôto and Tôkiô. On most of the high roads run small stage wagons of various sizes, but these are as a rule badly made, insecure, and for the conveyance of passengers alone. In the mountainous regions, and especially in the hills immediately behind the foreign settlement (Kôbé) at Hiôgo, in the province of Setsu, small bullock cars are to be seen. These are roughly made of untrimmed timber, and are anything but strong; each rests on three wheels of solid wood, and is drawn by one bullock. They are, however, very useful for the conveyance of blocks of stone from the hills, and for rough country work. In the large towns, and also on fairly level roads, passengers may travel in small two-wheeled carriages called *jin-riki-sha;* these are in shape like a miniature gig, and are as a rule drawn by a single coolie, though for rapid traveling two men are usually employed. In the city of Tôkiô alone there exist over 10,000 of these *jin-riki-sha*, and various improvements as regards their style, shape, and build have been introduced since 1870, the year in which they first came into use. Many are of sufficient size to carry two persons, and on a good road they travel at the rate of about six miles an hour; the rate of hire is about ten cents per Japanese *ri*, or about four cents per mile. For the transport of baggage or heavy goods large two-wheeled carts are in use; these are pushed along by four or six coolies. Until very lately the only vehicle employed in traveling was the palanquin. Of these there were two kinds, viz., the *norimono*, a large litter carried by several bearers, and principally used by persons of the better class, and the *kago*, still to be seen in hilly districts where carriages cannot pass. The *kago* is a mere basket-work conveyance, slung from a pole carried across the shoulders of two coolies; and it is easy to see that the substitution of the wheeled *jin-riki-sha* drawn by only one man was a great improvement as regards both economy of labor and facility of locomotion. In country districts, and wherever the roads are stony or narrow, long strings of packhorses meet the eye. These animals are shod with straw sandals to protect the frog of the hoof, and their burden is attached by a rough packsaddle without girths. They go in single file, and move only at a walk. In all the post-towns and in most of the larger villages are established transport offices, generally branches of some head office in the capital, at which travelers can engage *jin-riki-sha*, *kago*, packhorses, and coolies, or make arrangements for forwarding baggage, etc. The tariff of hire is fixed by the government, and this is paid in advance, a stamped receipt being given in return. Most of the inns in the post-towns subscribe to one or another of the so-called traveling guilds, each of which has a head office in Tôkiô, and often in Kiôto and Ôzaka.

The towns and villages are very numerous along the line of the great roads. The three great cities are Tôkiô (Yedo), Ôzaka, and Kiôto. The last-named was the ancient capital, and had been in existence for centuries before Tôkiô, and also for a very considerable time before Ôzaka was built. Now, however, these two have rapidly outstripped Kiôto both in size and importance, and are in fact the two great centers of trade throughout the whole country. The emperor's court now resides at Tôkiô, and it is there that the foreign legations are stationed. The city of Ôzaka (often wrongly spelt Osacca) is purely mercantile. The Japanese mint (opened in April, 1871,) is at Ôsaka. Next in importance to these three cities may fairly be classed the various ports thrown open, under the treaties with Western powers, to foreign trade. Yokohama, about eighteen miles to the south of the capital, and situated on the western shore of the Bay of Yedo, enjoys by far the greater proportion of the whole foreign trade of Japan.

The foreign settlement is very large, and numerous bungalows and small villas of the European residents are also built on a hill (known as the "Bluff") overlooking the "settlement" proper. The chief exports are tea and silk; the former goes principally to the United States and to England, and the latter to the French markets. Large business transactions also take place in silkworm eggs and cocoons, as well as in copper, camphor, and sundry other articles of trade. Nagasaki, the best known by name of all the open ports, is in the province of Hizen, in the large southwestern island of Kiushiu. The foreign settlement is small, though the native town is of considerable extent. Coal is the staple export.

Throughout the whole country schools have been established, for the support of which the government often gives substantial assistance. The cost of tuition in these establishments is generally fixed at a rate within the means of the poorest classes. In most of the remote villages the schoolhouse is now the most imposing building.

Court houses have been erected in each prefecture, where the laws are administered by government officials appointed by the department of justice at the capital. These courts are placed under a smaller number of superior courts, to which appeals lie, and these are in turn subordinate to a supreme court of appeal in Tôkiô.

Small police stations have been erected in all the towns and villages of any importance; along the high roads the system is carefully organized and well carried out, though in distant localities the police force is often wholly inadequate to the numbers of the population. The Japanese lower orders are, however, essentially a quiet and peaceable people, and thus are easily superintended even by a very small body of police. In the capital and the large garrison towns it is a different matter, and collisions frequently occur with the riotous soldiery. The military stations are established in some of the larger castles throughout the country, the principal garrisons being at Tôkiô, Sakura in Shimôsa, Takasaki in Kôdzuké, Nagoya in Owari, Ôzaka in Setsu, Hiroshima in Aki, and Kumamoto in Higo.

The army consists of 167,629 men on a peace footing, and is increased to 632,007 in time of war; the navy of thirty-one vessels, of which one is armor-plated, five are protected cruisers, and twenty torpedo boats.

The number of inhabitants in Japan was until lately very uncertain. To the ordinary traveler it would seem to be very dense, as the roadways are lined with villages; but in the wilder regions the population is widely scattered, and indeed in certain localities not a single dwelling-house is to be seen for miles together. The total has been generally asserted by the Japanese themselves to be about 30,000,000, the authority being a census made so far back as in 1804. A return compiled in 1875, however, put the exact total at 33,997,449; and the still later census of 1880 gave it as 34,338,404, of whom 17,419,785 were males, and 16,918,619 females. In 1899 it was estimated at 43,763,153. The population of the city of Tôkiô is variously stated, but is probably (1902) about 1,450,000. According to a computation made in the year 1898, Kiôto had then about 353,250 inhabitants. Of greater importance now than the latter comes Ôzaka, with a population of [illegible]21,235 souls. After Ôzaka may be mentioned Nagoya, the chief town of the province of Owari, followed closely by Hiroshima in Aki, Saga in Hizen, Kagoshima in Satsuma, Kanazawa in Kaga and Himéji in Harima—most of which are said to possess over 100,000 inhabitants. Fukui in Echizen and Gifu in Mino rank in the second class. Of the ports open to foreign trade, Ôzaka being excluded, Nagasaki is said to have the largest population, being very slightly in excess of Yokohama; Hakodaté and Niigata have perhaps about 30,000 each. The foreign communities are very small: they may be numbered at a few hundreds at Yokohama, Tôkiô, Kôbé, and Nagasaki, while at Ôzaka, Hakodaté, and Niigata the European residents may be reckoned by tens.

Although possessed of considerable mineral wealth, Japan cannot be called a rich country. The early foreign residents, from the time the treaties were made in 1858 and following years, were perhaps over-sanguine in their expectations. Recent commercial returns show that the balance of trade has been against Japan, her exports being considerably in arrear of the imports.

In spite of these financial difficulties, the Japanese have made great advances in public works. In the number of its lighthouses Japan may compare favorably with many a Western nation. Though all have been erected by foreign engineers during the past ten or twelve years, there is hardly a promontory or island lying in the direct track of the shipping but is possessed of a lighthouse. As already mentioned, good progress is being made in railway construction. Numerous lines of telegraph have been erected throughout the country, not only between the treaty ports, but also in the interior, particularly to the garrison towns and local government offices. The mint at Ôzaka has been working since the year 1871. At Yokosuka, on the western shore of the Bay of Yedo, are a dockyard and arsenal, superintended by French engineers.

The religious beliefs of the Japanese people may be divided under two heads, the *Shintô* and the Buddhist. By the former is meant the religious belief of the natives prior to the introduction from abroad of Buddhism and the Confucian philosophy.

Shintô means literally "the way of the gods." Though often styled by foreign writers a religion, it really is not one. No concise definition of it appears to exist, but the following are some of its leading points. It contains no moral code, the writer Motoori (a high authority on this subject, born 1730, died 1801) even asserting that in Japan there was no necessity for any system of morals, as every Japanese acted aright if he only consulted his own heart. He also declared that the whole duty of a good Japanese consisted in obeying implicitly and without question the commands of the *mikado*. In *Shintô* Japan is held to be the country of the gods, and the *mikado* to be the direct descendant and actual representative of the Sun goddess. In it there also seems to be mixed up a system of hero worship, many renowned warriors and other personages of ancient days being exalted into what we should term demi-gods; thus it inculcates a reverential feeling toward the dead. By it, too, spiritual agencies are attributed to the elements or natural phenomena.

The first Buddhist images and Sûtras were brought to Japan from Corea in the year 552, if we can believe the *Nihongi:* but it was long before the religion obtained much hold on the people. Buddhism long obtained complete ascendancy; it became the religion of the whole nation, and held that position until the Tokugawa dynasty of *shôgun*, when it was supplanted in the intellects of the educated class by the philosophy of Choo He.

Since the admission of foreigners into Japan, various Christian missions have been established, principally in Tôkiô and Yokohama, and a tolerably large number of missionaries reside in different parts of the country. Churches have been built, and schools opened for the instruction of children. Christianity is no longer prohibited, as of old, by government edict, and the number of the native converts is said to be increasing.

Japan is said to possess a written history extending over 2,500 years, and its sovereigns to have formed an unbroken dynasty since 660 B.C., the present emperor being the 121st of the race; but the authentic history begins about 400 A.D.

Within the last few years Japan has made unparalleled progress in civilization and the adoption of Western manners and systems. The feudal system under which the country was governed by numerous lords has been abolished, and the mikado is now absolutely the sovereign of the state. Since the revolution which abolished the feudal system peculiar to the country, she has shown a most remarkable power of adopting Western knowledge and experience. A wise and enlightened ruler is at the head of the nation, and the first national parliament, the outcome of the constitution granted to the people by the emperor, promulgated February 11, 1889, met for the first time in the autumn of 1890. The feudal lords, who have lost all their powers of government, still retain their high social positions, and a new aristocracy, with these as its basis, has been formed; it consists of five grades, corresponding to the European titles of duke, marquis, count, etc.

JAPANNING is the art of coating surfaces of metal, wood, etc., with a variety of varnishes, which are dried and hardened on, by means of a high temperature, in stoves or hot chambers, which drying processes constitute the main distinguishing features of the art. The trade owes its name to the fact that it is an imitation of the famous lacquering of Japan, although the latter is prepared with entirely different materials and processes, and is in all respects much more brilliant, durable, and beautiful than any ordinary japan work. Japanning is done in clear, transparent varnishes, in black, and in body colors; but black japan is the most characteristic and common style of work. The varnish for black japan consists essentially of pure natural asphaltum with a proportion of gum animé dissolved in linseed oil and thinned with turpentine; but there are numerous recipes given for the varnish, and manufacturers generally conceal the composition of their own preparations. In thin layers such a japan has a rich, dark brown color, and only shows a brilliant black in thicker coatings. For fine work, which has to be smoothed and polished, several coats of black are applied in succession, each being separately dried in the stove at a heat which may rise to near 300° Fahr. Body colors consist of a basis of transparent varnish mixed with the special mineral paints of the desired colors or with bronze powders. The transparent varnish used by japanners is a copal varnish which contains less drying oil and more turpentine than is contained in ordinary painter's oil varnish. By japanning a very brilliant polished surface may be secured which is much more durable and less easily affected by heat, moisture, or other influences than any ordinary painted and varnished work. Japanning may be regarded as a process intermediate between ordinary painting and enameling. It is very extensively applied in the finishing of ordinary ironmongery goods, and domestic iron work, deed boxes, clock dials, and papier-mâché articles. The process is also applied to blocks of slate for making imitation of black and other marbles for chimney pieces, etc., and a modified form of japanning is employed for prepared enameled japan, or patent leather.

JAPHETH, son of Noah. The most natural rendering of Gen. x. 21 is that which makes Shem the elder brother of Japheth, though the opposite view of the passage in the authorized version follows the Hebrew accents. Interpreters are not agreed whether the sacred text regards Japheth as the second or third son of Noah. In Gen. ix. 24 "youngest" is an easier rendering than "younger," but the name of Ham is always placed between those of his brothers. The whole Biblical importance of the sons of Noah is geographical or ethnographical; even in the narrative of Gen. ix. 20–27 the point lies in the blessings assigned to the nations or groups of nations named after each. The distribution of the Japhetic group is sketched in Gen. x. 2–4 from the geographical standpoint of the Levitical narrator, that is, according to the most recent criticism, of the sixth century B.C. The seven sons of Japheth are the nations lying north of the Semitic group or westward across the Mediterranean. The wide range of the Japhetic lands sufficiently explains the blessing in Gen. ix. 27, "May God enlarge Japheth." In the succeeding clause, "and let him dwell in the tents of Shem," it is disputed whether the subject is God or Japheth. In the latter case the allusion must be to friendly intercommunication and common settlements on equal terms, in contrast to the position of the subjugated Hamites (Canaan) under the lordship of the victorious Semites (Israel). The precise point of view from which the northern nations, and particularly those over the sea (Gen. x. 5), came to be grouped as sons of Japheth, is the more obscure because the etymology of the name is quite uncertain. The resemblance in sound to the Greek Iapetos has been often noticed, but leads to nothing.

JARCHI. See RASHI.

JARNAC, chief town of a canton in the arrondissement of Cognac, in the department of Charente, France, is situated on the right bank of the river Charente, about eight miles east of Cognac, and eighteen miles west of Angoulême. Population, 4,500.

JAROMIERZ, a town in the department of Königinhof, Bohemia, situated at the junction of the Aupa and Elbe. Population about 6,500.

JARRAH WOOD is the product of a large tree (*Eucalyptus marginata*) found in western Australia, where it is said to be very abundant. The trees grow straight in the stem to a great size, and yield squared timber up to forty feet in length and twenty-four inches in diameter. The wood is very hard, heavy, and close-grained, with a mahogany-red color, and sometimes sufficient "figure" to render it suitable for cabinetmakers' use. The timber possesses several useful characteristics; and great expectations have been formed as to its value for shipbuilding and general constructive purposes. These expectations have not, however, been realized, and the exclusive possession of the tree has not proved that source of wealth to western Australia which was at one time expected. Its greatest merit for shipbuilding and marine purposes is due to the fact that it resists, better than any other timber, the attacks of the *Teredo navalis* and other marine borers, and on land it is equally exempt, in tropical countries, from the ravages of white ants.

JARROW-ON-TYNE, a town and municipal burgh of Durham, England, is situated on the south bank of the Tyne, three miles southwest-by-west of South Shields, and seven miles southeast of Newcastle, with which it is connected by rail. Jarrow Slake is a river bay, one mile long by one-half mile broad, in which it is said that the fleet of King Egfrid found a station. On its banks are the new Tyne docks, formed at a great expense by the Northeastern Railway Company. These with the quays and adjacencies cover about 300 acres, of which fifty are water surface with a tidal basin of ten acres. The erection of the docks gave a great impetus to the trade of Jarrow. Iron shipbuilding (one yard employing 5,000 hands), iron-founding, and the manufacture of paper and chemicals are the chief sources of wealth, in addition to coal-mining. Pop. (1901), about 40,000.

JASHAR, or JASHER, BOOK OF. See HEBREW LANGUAGE AND LITERATURE.

JASHPUR, a tributary state of Chutiá Nágpur, Bengal, with an area of 1,947 square miles, is bounded on the north and west by the tributary state of Sargújá, on the south by Gángpur and Udáipur, and on the east by Lohárdagá district. The state of Jashpur consists in almost equal proportions of highland and lowland areas. Its pop. (1901) was about 100,000.

JASMIN, JACQUES, a noted Gascon poet, was born at Agen, France, March 6, 1798. His childhood was spent in the midst of privations and all the straits of poverty. His father, who was a tailor, had a certain facility for making doggerel verses, which he sang or recited at fairs and such like popular gatherings; and the younger Jasmin, who used generally to accompany him, was thus early familiarized with the double part which he afterward so successfully filled himself. In 1835 he published his first volume of *Papillotos* ("Curl Papers"), containing poems in French (a language he used with a certain sense of restraint), and in the familiar Agen patois — the popular speech of the working classes — in which he was to achieve all his literary triumphs. The dialect which Jasmin spoke, though still harmonious and full of picturesque idioms, was now almost exclusively used by illiterate persons, and was greatly modified by a daily contact with French. His real poetic gift, and his flexible voice and action, fitted him admirably for this double rôle of troubadour and jongleur. In 1835 he recited his *Blind Girl of Castel-Cuillé* at Bordeaux, in 1836 at Toulouse; and he met with an enthusiastic reception in both those important cities. Four successive volumes of *Papillotos* were published during his lifetime, and contained, among others, the following remarkable poems, quoted in order: *The Charivari*, *My Recollections* (supplemented after an interval of many years), *The Blind Girl*, *Françounetto*, *Martha the Simple* and *The Twin Brothers*. He died October 4, 1864.

JASMINE, or JESSAMINE, botanically *Jasminum*, a genus of shrubs or climbers constituting the principal part of the natural order *Jasminaceæ*, and comprising about sixty species. The plants of the genus are mostly natives of the warmer regions of the Old World, but there are one or two South American species. The leaves are pinnate or ternate, or sometimes apparently simple, consisting of one leaflet, articulated to the petiole. The flowers, usually white or yellow, are arranged in terminal or axillary panicles, and have a tubular five or eight cleft calyx, and a cylindrical corolla-tube, with a spreading limb, two included stamens, and a two-celled ovary.

The name is derived from the Persian *yásmín*. The common white jasmine, *Jasminum officinale*, one of the best known and most highly esteemed of hardy ligneous climbers, is said to be a native of India, and to have been introduced about the middle of the sixteenth century. In the center and south of Europe it is thoroughly acclimatized.

On account of their exquisite fragrance jasmine flowers are highly esteemed in the East, and are frequently referred to by the Persian and Arabian poets.

An essential oil is distilled from jasmine in Tunis and Algeria, but its high price prevents its being used to any extent. The East Indian oil of jasmine is a compound largely contaminated with sandalwood-oil.

The plant known in America as the "Carolina jasmine" is not a true jasmine (see GELSEMIUM).

JASON, grandson of the god Poseidon, or of the king Cretheus, is by his descent, as by his name, connected with the seafaring Ionians and their Poseidon religion. He was the leader of the Argonautic expedition, for the details of which see ARGONAUTS. After he returned from it he lived at Corinth with his wife Medea for many years. At last he put away Medea, in order to marry Glauce, daughter of the Corinthian king, Creon. The revenge which Medea took on Jason's new wife, and on her own children by him, is the subject of Euripides' greatest play. The story of Jason is one of the most famous in Greek mythology, and has run through a long course of development.

JASPER, an opaque, close-grained variety of quartz, variously tinted, but usually either red or brown—the color being due in the former case to the presence of peroxide of iron, and in the latter to the same oxide in a hydrated condition. Frequently the color is not uniform, and if the tints be disposed in stripes or bands, the mineral is termed *ribbon jasper*. A brown jasper occurring in nodules, and exhibiting variations of tint arranged in zones, is termed, from its locality, *Egyptian jasper*. Although the term jasper is now restricted to such varieties of quartz as present opacity, it is certain, from the descriptions of classical writers, that their *jaspis* was a stone of considerable translucency. The original jasper appears to have been green, inasmuch as it is often compared with the emerald and other green objects. Probably the jasper of the ancients included stones which we should now class as chalcedony and agate, while our jasper was then known as the *achates*. The emerald-like jasper appears to have been a green chalcedony, like the plasma and chrysoprase of modern mineralogists.

JASSY, JASIL, or JASCHI, formerly the capital of the principality of Moldavia, and now the chief town of a district in Roumania, is situated in the valley of the Bachlui (a tributary of the Pruth), about 200 miles to the north of Bucharest. The exterior aspect of the place is decidedly attractive and imposing; but the character and condition of the interior is disappointing. The trade of the town is mainly in the hands of the Jews, who formed a large and increasing proportion of its 80,000 inhabitants in 1900.

JÁSZ-BERÉNY, a corporate town of Hungary, and formerly capital of the Jászság (Jazygia) district (since 1876 incorporated with the Cis-Tisian county of Jász-Nagy-Kun-Szolnok), is situated on both banks of the Zagyva, crossed there by a stone bridge, and on the Hatvan-Szolnok line of railway, thirty-nine miles east of Budapest. The population is about 25,000, chiefly Magyars by nationality, and Roman Catholics by creed.

JÁTIVA, or SAN FELIPE DE JÁTIVA, according to the old orthography XÁTIVA, a city of Spain in the province of Valencia, is picturesquely situated on the margin of a beautiful and fertile huerta or plain at the foot of an overhanging eminence, on the right bank of the Albáida, a tributary of the Júcar. Population about 16,000.

JATS, an Indian people estimated to form two-fifths of the entire population of the Punjab and half that of the Rájput states. They are also widely spread through Sind, Baluchistan and the northwestern provinces. Their traditions indicate an immigration from Ghazní or Kandahar, but writers of authority have identified them with the ancient Getæ, and there is strong reason to believe them a degraded tribe of Rájputs, whose Scythic origin has also been maintained.

JAUBERT, PIERRE AMÉDÉE ÉMILIEN PROBE (1779–1847), French Orientalist, was born at Aix in Provence. He became professor of Persian in the Collége de France, and in 1830 was elected member of the Académie des Inscriptions. In 1841 his erudite services were rewarded by admission to the peerage of France, and by the rank of councilor of state. He died at Paris, January 27, 1847.

JAUER, chief town of a circle in the government district of Liegnitz, in the province of Silesia, Prussia, is situated on the Wüthende Neisse. Population (1901), about 13,000.

JAUHARY. Abu Nasr Isma'íl ibn Hammád el-Jauhary, of Fárâb, a district beyond the Jaxartes, on the borders of Turkestan, is one of the fathers of Arabic lexicography. After the fashion of the older Arabic philologists, he completed his studies by a residence among the tribes of the Arabian desert, and finally established himself at Naisâpûr, where he died by a fall from the roof of his house, leaving the revision of his great lexicon, the *Sihâh fi'l-Lugha*, incomplete. According to some accounts he committed suicide in a fit of insanity. Hajji Khalífa places his death 303 A.H. (1002–3 A.D.); others give 398 or 400.

JAULNA. See JÁLNA.

JAUNDICE, or ICTERUS (from its resemblance to the color of the golden oriole, of which Pliny relates that if a jaundiced person looks upon it he recovers but the bird dies), a term in medicine applied to a yellow coloration of the skin and other parts of the body, depending in most instances on some derangement affecting the liver. This yellow color is due to the presence in the blood of bile or of some of the elements of that secretion. Jaundice, however, must be regarded more as a symptom of some morbid condition previously existing than as a disease *per se.*

The manner in which jaundice is produced is still a matter of debate among physicians, but it is generally admitted that there are two classes of causes, either of which may bring about this condition. In the first place any obstruction to the passage of bile from the liver into the intestinal canal is sooner or later followed by the appearance of jaundice, which in such circumstances is due to the excessive absorption of bile into the blood. To this variety the term *obstructive* jaundice is applied. But secondly, a form of jaundice may be produced by causes not embracing obstruction, but including a variety of morbid conditions affecting either the secreting structure of the liver or the state of the blood, and to this the term *non-obstructive* jaundice is applied.

The symptoms of obstructive jaundice necessarily vary according to the nature of the exciting cause, but there generally exists evidence of some morbid condition before the yellow coloration appears. Thus, if the obstruction be due to an impacted gall stone in the common or hepatic duct, there will probably be the symptoms of intense suffering characterizing "hepatic colic" (see COLIC), after which the jaundice appears. In the cases most frequently seen—those, namely, arising from simple catarrh of the bile ducts due to gastro-duodenal irritation spreading on to the liver through the common duct—the first sign to attract attention is the yellow appearance of the white of the eye, which is speedily followed by a similar color on the skin over the body generally. The yellow tinge is most distinct where the skin is thin, as on the forehead, breast, elbows, etc. It may be also well seen in the roof of the mouth, but in the lips and gums the color is not observed till the blood is first pressed from them. The tint varies, being in the milder cases faint, in the more severe a deep saffron yellow, while in extreme degrees of obstruction it may be of dark brown or greenish hue. The color can scarcely, if at all, be observed in artificial light.

The urine exhibits well-marked and characteristic changes in jaundice which exist even before any evidence can be detected on the skin or elsewhere. It is always of dark brown color resembling porter, but after standing in the air it acquires a greenish tint. Its froth is greenish-yellow, and it stains with this color any white substance. It contains not only the bile coloring matter, but also the bile acids. The former is detected by the play of colors yielded on the addition of nitric acid, the latter by the purple color produced by placing a piece of lump sugar in the urine tested, and adding thereto a few drops of strong sulphuric acid. This test for the bile acids is dwelt upon by Dr. George Harley as an important point in serving to distinguish jaundice with obstruction from jaundice without obstruction, in the latter of which, although there is bile pigment in the urine, the bile acids are absent.

The contents of the bowels also undergo changes, being characterized chiefly by their pale clay color, which is in proportion to the amount of hepatic obstruction, and to their consequent want of admixture with bile. For the same reason they contain a large amount of unabsorbed fatty matter and have an extremely offensive odor.

Constitutional symptoms always attend jaundice with obstruction. The patient becomes languid, drowsy, and irritable, and has generally a slow pulse. The appetite is usually but not always diminished, a bitter taste in the mouth is complained of, while flatulent eructations arise from the stomach. Intolerable itching of the skin is a common accompaniment of jaundice, and cutaneous eruptions or boils are occasionally seen. Yellow vision appears to be present in some very rare cases. Should the jaundice depend on advancing organic disease of the liver, such as cancer, the tinge becomes gradually deeper, and the emaciation and debility more marked toward the fatal termination, which in such cases is seldom long postponed. Apart from this, however, jaundice from obstruction may exist for many years, as in those instances where the walls of the bile ducts are thickened from chronic catarrh, but where they are only partially occluded. In the common cases of acute catarrhal jaundice recovery usually takes place in two or three weeks.

The treatment of this form of jaundice bears reference to the cause giving rise to the obstruction. In the ordinary cases of simple catarrhal jaundice, or that following the passing of gall stones, a light nutritious diet (milk, soups, etc., avoiding saccharine and farinaceous substances and alcoholic stimulants), along with counter-irritation applied over the right side, and after a few days the use of laxatives which tend to promote the flow of bile, will be found to be advantageous. Rhubarb, taraxacum, podophyllin, mercury, are among the remedies which have long been employed for this purpose, but the recent researches of Professor Rutherford have brought to light certain other agents (euonymin, iridin, leptandrin, etc.), which exercise a powerful influence as cholagogues, and are now coming into use. Diaphoretics and diuretics to promote the action of the skin and kidneys are useful in jaundice. In the more chronic forms, besides the remedies above named, the waters of Carlsbad are of special efficacy. Where the jaundice depends on changes in the substance of the liver, altering its structure, such as cancerous deposit, all that can be accomplished is the palliation of symptoms, including the jaundice, which may be mitigated by the treatment already indicated. With the view of supplying bile to the alimentary canal, Doctor Harley recommends the use of inspissated ox-gall in doses of five to ten grains administered in capsules of gelatin.

2. *Jaundice without obstruction* is observed to occur as a symptom in certain fevers, *e.g.*, yellow fever, ague, and relapsing fever, and in pyæmia (blood poisoning), also as the effect of the action of certain poisonous substances, such as copper, mercury, antimony, phosphorus, etc., and the venom of snake bites. It is occasionally

seen in new-born infants. It is sometimes suddenly induced as the result of strong mental excitement or emotion. Much difficulty has always been felt to account for this form of jaundice, and numerous theories have been advanced to explain its occurrence. Many of such cases might probably, as Virchow observes, be found on careful investigation to depend on some obstruction in the biliary passages; but there can be no doubt that many others admit of no such explanation, and as regards these it is generally held that they are probably connected with some alteration in the coloring matter of the blood, the source, it is believed, of the bile pigment. Others suppose this form of jaundice to be due to an excess in the normal reabsorption of bile into the blood. The pathology, however, is still unsettled. Jaundice of this kind is almost always slight, and neither the urine nor the discharges from the bowels exhibit changes in appearance to such a degree as in the obstructive variety. Grave constitutional symptoms are often present, but they are less to be ascribed to the jaundice than to the disease with which it is associated.

The name *malignant jaundice* is sometimes applied to that very fatal form of disease otherwise termed acute yellow atrophy of the liver. See ATROPHY.

JAUNPUR, a British district in the lieutenant-governorship of the Northwestern Provinces, India. It forms the northeastern district of the Allahábád division.

The district of Jaunpur forms part of the wide Gangetic plain, and its surface is accordingly composed of a thick alluvial deposit. The whole country is closely tilled, and no waste lands break the continuous prospect of cultivated fields. The northern and central positions are richly wooded.

The census was taken upon an area of 1,556 square miles, and it disclosed a total population of 1,025,961, of whom 545,752 were males and 480,209 females. Jaunpur is essentially a Hindu district, in spite of its long subjection to Mahometan rulers.

JAUNPUR, a municipal town and the administrative headquarters of the above district, situated on the northern bank of the river Gumti. Jaunpur is a very ancient city, the former capital of a considerable Mahometan kingdom, which once extended from Budáun and Etáwah to Behar. It abounds in splendid architectural monuments, most of which belong to the Pathán period, when the rulers of Jaunpur made themselves independent of Delhi. The population in 1901 was about 25,000.

JAVA. Among the islands of the Indian archipelago Java is not the largest, being surpassed in this regard by Borneo, New Guinea, Sumatra and Celebes; but in every other respect it is the most important of them all. It has passed through the most remarkable vicissitudes, has been the scene of the most eventful occurrences, and possesses the noblest memorials of bygone splendor. It supports a larger population than all the other islands of the Indian Ocean together, a population as dense indeed as that of the most populous of European countries. In natural beauty it rivals the most favored regions in the world. Through the mildness of its climate and the industry of its people it possesses a richer store of valuable productions than almost any country of equal extent can boast; its ricefields make it the granary of the East Indian islands, and its coffee and sugar plantations are a perpetual source of wealth to Holland, the country which has the good fortune to claim its allegiance.

The greatest length of Java measured from Pepper Bay in the west to Banyuwangi in the east, amounts to no less than 622 miles; its greatest breadth—from Cape Bugel in Japara to the south coast of Jokjokarta—is only 121. The area is estimated at 49,176 square miles, nearly four times that of Holland (12,731 square miles). Both physically and administratively the island of Madura, separated from the main island by a narrow strait, must be taken along with Java; and the same is more or less the case with a number of smaller islands—Pulo Panitan or Princes' Island, lying off the most western promontory, the Thousand Islands, the Karimon-Djawa (Carimon Java) archipelago, about fifty miles to the north of Japara, Bawean (Bavean), a little further to the north of Madura, the Sumanap islands to the northeast of Madura, and Deli, Tindjil, Nusa Kambangan, Sempu, and Nusa Barung off the south coast. These all being included, the area of what is officially known as Java and Madura amounts to 50,554 square miles.

There is a striking difference between western and eastern Java in the main features of relief. The western portion, exclusive of the northern alluvial coast land, is a compact mass of mountains culminating in volcanic peaks nowhere interrupted by plains or lowland valleys. In the eastern and larger portion the volcanoes rise in independent clusters, and the valleys between open out into wide champaigns. Even in the east the number of volcanic eminences is exceptionally large; and, if the whole island be taken into view, there is scarcely any region of the world of equal extent which can boast of so many. The loftiest of them all is Semeru, with a height of 12,238 English feet.

The central ridge, in which, with the single exception of Muria, all the volcanic peaks are situated, contains a large number of other summits upward of 6,000 feet in height, and several rise beyond 9,000 feet. On both the north and south sides the volcanic chain is flanked by ranges composed of Tertiary rocks; these attain an elevation on the south frequently of between 2,000 and 4,000 feet, and occasionally in the Preanger Regencies of 5,000 or 6,000 feet. To the northern flanking range belongs the whole of the island of Madura, which has its highest point in Gunong Tambuko. The northern versant of Java differs from the southern in the great development of its alluvial border, which in one or two places widens out into considerable plains, and from this it naturally results that the streams flowing into the Sea of Java are both in length and course and volume of water more important than those that fall into the Indian Ocean. Their number in both cases is very great; but none even of the northern streams are navigable for vessels of burden, and only a few for boats beyond the reach of the tide. The largest and in some aspects the most useful of all the rivers is the Bengawan, or river of Solo, so called from Solo, the popular name of the city of Surakrata.

Java being situated but a short distance from the equator, with the wide expanse of the Indian Ocean extending to the south, the climate is one of tropical heat and moisture.

Java is situated in the region of the southeast trade wind, and that is the prevailing direction of the wind during one-half the year, from April to October. During the other half of the year a northwest or west wind (the physical continuation of the northeast trade wind) blows with nearly equal steadiness. The former period is known as the dry season or east monsoon, and the latter as the rainy season or the west monsoon. The distinction between the dry and the rainy seasons is most marked in the eastern portion of the island; and indeed when we come as far west as Batavia it cannot be said that there is any part of the year altogether free from rain. During the dry season the well-known phenomenon of land and sea breezes is very distinctly exhibited; during the rainy season, through obvious causes, the alternation becomes much less regular.

The vegetation of Java is rich and diversified. Few of the plants being deciduous, the island at all times presents the same appearance as the most fertile temperate regions at the height of summer. Junghuhn divided the island into four botanical zones, and his division has been commonly adopted by his successors. The first or tropical zone extends from the seaboard to a height of 2,000 feet; the second or that of moderate heat has its upper limit at a height of about 4,500 feet; the third or comparatively cool region reaches a height of 7,500 feet; and the fourth or coldest region comprises all that lies above that elevation. It is evident that from the structure of the island the lowest zone has by far the most extensive area; the second indeed is only a fiftieth of the first, and the third is only a five-thousandth. The lowest zone is the region of the ricefields and sugar plantations, of cocoanuts, cinnamon, and cotton. According to their character the coasts are fringed with mangroves, nipah, and other palm-trees, and the kayu gabas (*Alstonia scholaris*); the ponds and lakelets are covered with *Utriculariæ* and lotus flowers; vast prairies are clothed with the silvery alang-alang grass, broken by thickets of bamboos and patches of the taller eri grass and glagah. The second zone is the region more especially of the coffee and the tea plantations, of the areng or sugar palm, and of maize. In the forests there is a great profusion of woody lianas, rotangs, and cissus varieties. In the third zone, which consists mainly of the slopes of volcanic mountains, but also comprises a few plateaus, there is little cultivation except in the Tenger mountains, where the natives raise Indian corn, cabbage, and potatoes, and at Simpungan (the highest village in Java, 6,680 feet) on the Dieng plateau, where even tobacco is most successfully cultivated. The fourth zone, so far as phanerogamous plants are concerned, has a very restricted vegetation, somewhere about one hundred species being known; but there is a corresponding abundance of cryptogams; fungi are common, and mosses cover the ground and invest the trees. The whole flora of this upper region bears a strong European cast.

In respect of its fauna, Java differs from Borneo, Sumatra, and the Malay peninsula far more than these differ among themselves; and at the same time it shows close resemblances—not exhibited by Borneo and Sumatra—to the Siamese peninsula and also to the Himalayas. No genus and only five or six of the ninety species of Javanese mammals are confined to the island; and of the two hundred and seventy species of land birds only forty are peculiar. Thirteen genera of mammals, including the elephant, the tapir, and the Malay bear, found in the rest of the Malay region, are altogether absent; and twenty-five Malayan genera of birds —comprising jays, gapers, bee-eaters, woodpeckers, hornbills, cuckoos, pheasants, and partridges—are in like case.

The Javanese rhinoceros, the largest of the mammals in the island, differs from that of Sumatra in having only one horn instead of two. It ranges over the highest mountains, and its regular paths—worn into deep channels—may be traced up the steepest slopes and around the rims of even active volcanoes. Of wild swine there are two species, *Sus vittatus* in the hot region and *Sus verrucosus* in the temperate. Both are extremely abundant, and their depredations are the cause of much loss; in the residency of Japara, for instance, upward of five thousand have been killed in two months. Not much less than the rhinoceros is the banting or *Bos sundaicus*, to be found in all the uninhabited districts between 2,000 and 7,000 feet of elevation. The kidang or mintjac (*Cervulus muntjac*) and the rusa (*Rusa hippelaphus*) are the chief representatives of the deer kind; the former is a delicate little creature occurring singly or in pairs both in the mountains and in the coast districts; the latter, living in herds of from 50 to 100 in the grassy "opens," gives excellent sport to the native hunters. The kantjil (*Tragulus javanicus*) is little bigger than a hare. The royal tiger—the same species as that of India—is still frequent enough in the forests to make a tiger-hunt a characteristic Javanese scene, and to permit the native princes to exhibit at times a tiger and buffalo fight. The leopard is also common. In the tree tops, the birds find a treacherous enemy in the matjah rempak or wild cat (*Felis minuta* or *Leopardus javanensis*), about the size of a common cat, with the markings of its larger namesake. The dog-tribe is represented by the fox-like adjag (*Canis rutilans*), which hunts in ferocious packs.

The *Cheiroptera* hold a prominent place in the fauna. Remarkable especially for size is the kalong or flying-fox (*Pteropus edulis*), a fruit-eating bat, which may be seen hanging during the day in black clusters asleep on the trees, and in the evening hastening in dark flocks to its favorite feeding grounds in the forest. The damage these do to the young cocoanut trees, the maize, and the sugar-palm leads the native to snare and shoot them; and their flesh is good to eat. The apes are represented by the wou-wou (*Hylobates leuciscus*), the lutung, and kowi (*Presbytes maurus* and *pyrrhus*) the surili (*Presbytes mitratus*), and, most general of all, *Macacus cynomolgus.* The existence of bands of the wou-wous is only too distinctly proved in the second zone by the loud and cacophonous outcry from which their name is derived. The lutung or black ape prefers the temperate region, though it is met with as high as 7,000 feet above the sea and as low as 2,000. Rats, mice, porcupines, a particular kind of hare (*Lepus nigricollis*—confined to a very limited habitat), squirrels, flying squirrels, are the Javanese representatives of the *Rodentia;* and the *Insectivora* comprise a shrew mouse, three species of *Cladobates*, and *Hylomys suillus*, peculiar to Java and Sumatra.

In the eyes of a Javanese to lack rice is to lack food. About the introduction of this divine cereal he tells strange legends, considering it the offspring of the body of Dewie Srie. The cultivation of the rice appears at present to be often carried on at a dead loss. The varieties of the cereal known to the Javanese are numerous; but they are commonly grouped as *Oryza sativa*, *præcox*, *montana* and *glutinosa.* The first is the kind mainly sown in the *sawahs* or irrigation fields; the *montana*, on the other hand, is suited for those in which there is no artificial irrigation—either gogo-land, which has been only rudely cleared from the forest and brought under imperfect or temporary tillage, or the tagal, which is regularly subject year after year to the processes of husbandry.

The Javanese possess buffaloes, ordinary cattle, horses, dogs and cats. Attempts made by the government to introduce the ass (1841), and the camel (1843–45), were not successful.

The production of rice is not of more importance to the native Javanese than the cultivation of the coffee-plant is to their European masters. The first coffee plants grown in Java of which we have historical accounts were brought from Kananore on the coast of Malabar, in 1696; but they perished in the earthquake and flood of 1699, and the honor of reintroducing the precious shrub belongs to Hendrik Zwardekroom. The first shipment of Javanese coffee to the Netherlands was made in 1711–12; but it was not till after 1721 that the yearly exports reached any considerable amount. The aggregate quantity sold in the home market from 1711 to 1791 was 2,036,437 piculs (of 133 pounds avoird.), and this must have represented nearly the whole production of the island. By the beginning of the nineteenth century the annual production was 120,000 piculs, and in spite of political interruptions this had increased by 1825 to 268,000 piculs. After the introduction of the Van den Bosch system a further augmentation was effected; and from the official reports it appears that from 1840 to 1873 the amount has ranged from 769,000 to 1,234,000 piculs. During the ten years 1869–1878 the average annual produce of the government plantations was 878,000, that of the private planters 156,000 piculs. In 1878 the actual quantity of government coffee was 831,515 piculs, and it was estimated that the total number of full-grown plants in the island was 14,180,000. The collecting warehouses were 367. Next in importance to the coffee plant is the sugar cane. The tobacco plant is grown in nearly all the residencies, but most extensively in Kediri and Besuki. The production for the foreign market amounted in 1879 to 7,050,000 pounds.

Mechanic Arts.—In these the Javanese are in advance of the other people of the archipelago. Of thirty different crafts practiced among them, the most important are those of the blacksmith or cutler, the carpenter, the kris-sheathmaker, the coppersmith, the goldsmith, and the potter. Their skill in the working of the metals is the more noteworthy as they have to import the raw materials. The Javanese gold and silver work possesses considerable beauty, but there is nothing equal to the filligree of Sumatra; the brass musical instruments are of exceptional excellence. Both bricks and tiles are largely made, as well as a coarse unglazed pottery similar to that of Hindustan; but all the finer wares are imported from China. Cotton spinning, weaving and dyeing are carried on for the most part as purely domestic operations by the women.

The data for tracing the increase of the population are far from satisfactory; and the returns even of the present time can only be accepted as rough approximations.

The population has increased considerably since 1897, when the return showed a total of 26,125,053. The most densely peopled districts (those occupied by the Javanese proper) have a greater number of inhabitants to the square mile than Belgium; the Sunda lands, on the other hand, and the Madurese districts have in comparison a sparse population.

The principal local European authority is known as the *resident*, who exercises judicial, financial, and administrative functions. As president of the council and judge of the residency court he deals both with civil and with criminal cases; and he also acts as police magistrate in his more immediate district. Each of the *assistant residents* administers under his supervision one of the territorial departments into which each residentship is divided. Next in rank is the European secretary of the resident, who, as occasion demands, acts as the resident's substitute as president of the council, and performs a great variety of duties as recorder, notary public, registrar, etc. Subject to the assistant resident is the controller. It is his first duty to look after the interests of the native population, and he may be considered as the link that connects the European with the native functionaries. Under the perpetual guidance of these residents, assistant residents, and controllers, a large part of the administration of the country is carried on by the native functionaries. Of these the highest is the *regent*, whose rank and right of precedence are superior even to that of all European officials below the resident. Always belonging to one of the ancient noble families, he maintains the state and retinue of an independent prince, with all the elaborate environment of Oriental etiquette. He receives a large salary from the Dutch Government, possesses, in virtue of his office, a landed estate, and exercises large authority over the people of his regency. By the European officials also he is treated with full respect and consideration. But, appointed by the governor-general, he, as much as any ordinary official in the civil service, holds his office by the goodwill of the Dutch Government. Insubordination is followed by dismissal; and dismissal involves the forfeiture of all the wealth and prestige which he possessed as regent.

Chief Towns.—The principal town of the residency of Bantam is Serang, bearing the same relation to the town of Bantam (about six miles distant) as New Batavia bears to Old Batavia. It is only 100 feet above the sea-level, but even this elevation renders the climate much better for Europeans than that of Bantam, and it is owing to this that Serang has come to supplant the older city. Anyer lies on the coast at the narrowest part of the Sunda Straits, and vessels from Europe usually receive fresh provisions and water there. *Pandeglang* is 787 feet above the sea; in the vicinity are sulphur springs, both hot and cold.

Batavia, the capital of Dutch India, has already been described elsewhere. The Preanger Regencies (Bandung, Tjandjur, Sumedang, Limbangan, Sukapura) constitute the most important of all the residencies. Bandung, the capital of the residency since 1864, is a flourishing place.

Cheribon (Tjeribon) is one of the most important places in Java, though the unhealthiness of the site has caused a number of the principal Europeans to settle about two miles to the north at Tangkil.

Tagal has long been one of the chief towns in Java—foreign commerce, and native trade, industry, and fisheries being all well developed. Samarang lies on the Kali Ngaran near the center of the north coast.

Japara was in Valentijn's days one of the most flourishing of the Javanese coast towns; and it was still a place of prosperous commerce during the British occupation; but the harbor has greatly deteriorated, and the town is declining. Joana has a strikingly Dutch appearance; it is often mentioned in the early narratives. Kudus is a place of more than 14,000 inhabitants. Rembang, a well-built town, contains a considerable European settlement and a number of European institutions; the population exceeds 10,000.

Surabaya, as already mentioned, is the largest town in Java, and ranks next to Batavia in the variety of its religious, educational, charitable, and commercial institutions.

Leaving out of view the Europeans and the Oriental immigrants—scarcely a seventh part of the population—the inhabitants of Java consist of the Javanese proper, the Sundanese, and the Madurese. All three belong to the Malay stock. Between Javanese and Sundanese the distinction is mainly due to the influence of the Hindus on the former and the absence of this on the latter. The residencies of Tagal, Pekalongan, Banyumas, Bagelen, Kadu, Samarang, Japara, Surakarta, Jokjokarta, Rembang, Madium, Kediri, and Surabaya have an almost purely Javanese population. Professor Veth estimates the number of the Sundanese at about 4,000,000, the Madurese at 1,600,000, and the Javanese at 11,500,000. The Javanese are the most civilized of the three peoples.

The Javanese are nominally Mahometans, as in former times they were Buddhists and Brahmans; but in reality, not only such exceptional groups as the Kalangs of Surakarta and Jokjokarta and the Baduwis or nomad tribes of Bantam, but the great mass of the people, must be considered as believers rather in the primitive animism of their ancestors, and in the essence of their creed but little removed from their ruder brethren the Dayaks of Borneo and the Battaks of Sumatra.

Javanese, Sundanese, and Madurese are the three native languages of Java and Madura.

JAWAROW, the chief town of a district in the Austrian crown land of Galicia, with extensive suburbs. It contains a nunnery, and has a good grain market. Population about 10,000.

JAXARTES. See SYR DARIA.

JAY (French, *Géai*), a well-known and very beautiful European bird, the *Corvus glandarius* of Linnæus, the *Garrulus glandarius* of modern ornithologists. To this species are more or less closely allied numerous birds inhabiting the Palæarctic and Indian regions, as well as the greater part of America, but not occurring in the Antilles, in the southern portion of the Neotropical region, or in the Ethiopian or Australian. All these birds are commonly called Jays, and form a group of the Crows or *Corvidæ*, which may fairly be considered a subfamily, *Garrulinæ*. In structure the Jays are not readily differentiated from the Pies; but in habit, so far as is known of them, they are much more arboreal, delighting in thick coverts, seldom appearing in the open, and seeking their food on or under trees. They seem, also, never to walk or run when on the ground, but always to hop. The body feathers are commonly loose and soft; and, gayly colored as are most of the species, in few of them has the plumage the metallic glossiness it generally presents in the Pies, while the proverbial beauty of the "Jay's wing" is due to the vivid tints of blue—turquoise and cobalt, heightened by bars of jet-black, an indication of the same style of ornament being observable in the greater number of the other forms of the group, and in some predominating over nearly the whole surface. Of the many genera that have been proposed by ornithologists, perhaps about nine may be deemed sufficiently well established.

The ordinary European Jay, *Garrulus glandarius*, has of late years suffered so much persecution in the British Islands as to have become, in many districts, a rare bird.

Leaving the true Jays of the genus *Garrulus*, it is expedient next to consider those of a group named, in 1831, *Perisoreus* by Bonaparte, and *Dysornithia* by Swainson. This group contains two species—one the *Lanius infaustus* of Linnæus and the Siberian Jay of English writers, which ranges throughout the pine-forests of the north of Europe and Asia, and the second the *Córvus canadensis* of the same author, or Canada Jay, occupying a similar station in America. The so-called Siberian Jay is one of the most entertaining birds in the world. Its versatile cries and actions, as seen and heard by those who penetrate the solitude of the northern forests it inhabits, can never be forgotten by one who has had experience of them. It seems scarcely to know fear, obtruding itself on the notice of any passenger who invades its haunts, and, should he halt, making itself at once a denizen of his bivouac. In confinement it speedily becomes friendly, but suitable food for it is not easily found. The Canada Jay, or "Whisky Jack" (the corruption probably of a Cree name), seems to be of a similar nature, but it presents a still more somber coloration, its nestling plumage, indeed, being thoroughly Corvine in appearance and suggestive of its being a pristine form.

As though to make amends for the dull plumage of the species last mentioned, North America offers some of the most brilliantly colored of the subfamily, and the common Blue Jay of Canada and the Eastern States of the Union, *Cyanurus cristatus*, is one of the most conspicuous birds of the transatlantic woods.

JAY, JOHN, American statesman, was the descendant of a refugee Huguenot family, and was born at New York, December 12, 1745. After three years spent in the house of the pastor of the French church at New Rochelle, followed by four under a private tutor at home, he entered King's (now Columbia) College in 1760. On graduating there, May 15, 1764, he entered the office of a New York lawyer; and in 1768 he was called to the bar. He rapidly rose into a lucrative practice, and in 1774 was married to Sarah, youngest daughter of William Livingston, afterward governor of New Jersey. Jay took an eager, active part in the proceedings that resulted in the independence of the United States. He was one of the committee of fifty selected by the citizens of New York in 1774 to correspond with other colonial committees on the subject of the Boston Port Bill. He was returned as a delegate from New York city to the Continental Congress held at Philadelphia in September, 1774, and, though almost the youngest member, was intrusted with drawing up the *Address to the People of Great Britain.* The numerous committees and associations which were from time to time appointed to meet the exigencies of that troubled period almost always included Jay's name. Of the second Congress also, which met at Philadelphia on May 10, 1775, Jay was a member; and his able and eloquent pen was again useful in writing addresses to the peoples of Canada and Ireland. He was a member of the secret committee of Congress for corresponding with the friends of America in Europe. In April, 1776, while still retaining his seat in Congress, Jay was returned to the provincial convention of New York by New York city and county; and his consequent absence from Philadelphia deprived him of the honor of affixing his signature to the Declaration of Independence issued on July 4, 1776. It was Jay who drafted the constitution that was finally adopted by the New York convention; and that statesman, after acting as one of the council of safety for some time, accepted a provisional appointment as chief justice of New York State, which was afterward confirmed under the organized constitution, with the proviso that he could hold with his judicial post no other save that of delegate to Congress "on special occasion." Such occasion was found in the secession of what is now the State of Vermont from the jurisdiction of New Hampshire and New York. Jay was sent to Congress (December 7, 1778), of which he was immediately elected president. The following September his letter, written in the name of Congress, was addressed to the people of the States on the subject of currency and finance; and before the end of the year, having previously resigned his chief-justiceship and his presidency, he was dispatched as plenipotentiary to Spain, where he landed January 22, 1870. The results of the mission were unsatisfactory. In addition to the fact that he was not received by the Spanish court in a formally diplomatic character, he was seriously embarrassed by the action of Congress in drawing bills upon him for more than half a million dollars, in the hope apparently that he would have received a subsidy from Spain before the bills fell due. Although by stooping to the humiliation of importuning the Spanish minister, and by accepting a number on his own personal responsibility, Jay was able to meet some of the bills, he was at length forced to protest others; and the credit of the new country was only saved by a timely subsidy from France, out of which Franklin was enabled to remit from Paris the sum required to meet the bills then due. In 1781 Jay was commissioned to act with Franklin, Adams, Jefferson, and Laurens in negotiating a peace with Great Britain. He arrived in Paris from Spain, June 23, 1782; and after a variety of negotiations, in the course of which Jay evinced a jealous suspicion of the disinterestedness of France and a punctilious attention to the dignity of his country, the provisional articles were signed on November 30, 1782, and the formal treaty on September 3, 1783. Jay resigned his commissions, and on July 24, 1784, landed as a private citizen in New York, where he was presented with the freedom of the city, and elected to Congress. On May 7th the last-named body had already chosen him to be secretery of state, and in that post he remained till the beginning of the Federal Government in 1789. In the question of the institution of such a government he had taken a keen interest: he joined Hamilton and Madison in issuing the *Federalist;* he published anonymously (though without succeeding in concealing the authorship) *An Address to the People of New York*, in vindication of the constitution; and he ably seconded Hamilton in inducing his native State to adopt it. On September 26, 1789, he became the first chief-justice of the supreme court of the United States. During one of his circuits Harvard University conferred on him the degree of LL.D. In 1792 he consented to stand for the governorship of New York State; but the canvassers who scrutinized the votes disqualified the returns of three counties; and, though Jay had received an actual majority of votes, his opponent, General Clinton, was declared elected.

During the war between Great Britain and France, the relations between the former and the American States became critical; a definite commercial treaty seemed the only means of averting war. Chief-Justice Jay was chosen envoy to England, though not without strong opposition. He landed at Falmouth in June, 1794, signed a treaty with Lord Grenville on November 19, and disembarked again at New York, May 28, 1795. Several of the articles of "Jay's Treaty," especially that which declared that a free ship did not make free cargo, were hailed at home with furious denunciation. Jay was accused of having betrayed his country; his effigy was burnt along with copies of the treaty, and even after Washington signed the ratification in August, the States were in a ferment that prevented for a time the really beneficial action of the treaty. Two days before he landed, and before the particulars of the treaty had been published, Jay had been triumphantly returned as governor of his native State, and, notwithstanding his temporary unpopularity, he was reëlected in April, 1798. With the close of this second term of office in 1801, he closed his public career. Although not yet fifty-six years old, he refused all offers of office, and, retiring to his estate near Westchester, N. Y., he spent the rest of his life in rarely interrupted seclusion. His public utterances from 1821 till 1828 were mostly as president of the American Bible Society. On May 17, 1829, John Jay, in his eighty-fourth year, ended a life whose purity and integrity are commemorated in a sentence by Daniel Webster: "When the spotless ermine of the judicial robe fell on John Jay, it touched nothing less spotless than itself."

JAY, WILLIAM (1769–1853), dissenting preacher and religious author, was born in Tisbury, in Wiltshire, England.

JEAN D'ANGÉLY, SAINT, chief town of an arrondissement in the department of Charente-Inférieure, France, is situated in a fertile vine-bearing district on the right bank of the river Boutonne, sixteen miles southeast of La Rochelle. Population about 8,000.

JEBEIL, JUBEIL, or DJEBAIL, an ancient town of Syria, is pleasantly situated on a slight eminence near the sea, about twenty miles north of Beyrout. The stele of Jehawmelek, king of Gebal, found here is one of the most important Phœnician monuments. The small port is almost choked up with sand and ruins. The place has dwindled to a village of some 600 inhabitants.

JEDBURGH, a royal and parliamentary burgh of Scotland, the county town of Roxburghshire, is situated on the river Jed, a tributary of the Teviot, forty-nine miles southeast of Edinburgh, and ten miles north of the English border. The population is 3,400.

JEFFERSON, THOMAS, the third president of the United States, and the most conspicuous apostle of Democracy in America, was born April 2, 1743, at Shadwell, Albemarle county, in the State of Virginia, a region of which his father, Peter Jefferson, was the third or fourth settler.

At the early age of five years Thomas was sent to an English school, and from that time until he finished his studies at William and Mary College in 1762 appears to have enjoyed superior educational advantages, and to have turned them all to good account. He carried with him from college, at nineteen, a tolerably thorough reading knowledge of the Latin, Greek, and French languages, to which he added a familiarity with the higher mathematics and natural sciences only possessed at his age by men who have, as he had, a rare natural faculty for the prosecution of those studies. Soon after leaving college he entered the law office of Mr. George Wythe, then at the head of the Virginia bar, and withal, Jefferson being judge, "the best Latin and Greek scholar in the State." In Mr. Wythe he found a "faithful and beloved mentor in youth and most affectionate friend through life." In 1767, after five years' close application to the study of his profession, he was admitted to the bar. The death of his father, in 1757, left Thomas, who was the eldest son, heir to the estate on which he was born, and which yielded him an income of about $2,000 a year, a sum in those days sufficient to gratify all his tastes, and to give him, as he matured, the position of an independent country gentleman. At the time of his admission to the bar he is described by his contemporaries as six feet two inches in height, slim, erect as an arrow, with angular features, a very ruddy complexion, an extremely delicate skin, full deep-set hazel eyes, and sandy hair, an expert musician (the violin being his favorite instrument), a good dancer, a dashing rider, and a proficient in all manly exercises. He was, and continued through life, frank, earnest, cordial, and sympathetic in his manner, full of confidence in men, and sanguine in his views of life.

Though mostly known to fame as a statesman, Jefferson's success as a lawyer showed that the bar had no rewards which were not fairly within his reach. He had sixty-eight cases before the chief court of the province the first year of his practice, and nearly twice that number the second. In the fourth, his register shows that he was employed in four hundred and thirty cases. During the eight years that he continued in active practice his income had enabled him to live like a gentleman, and to add a few hundred acres to his landed estate from time to time, until his inheritance of 1,900 acres had become, in 1774, 5,000 acres, and all paid for. But, while fired with the Virginian passion of the period for acquiring land, Jefferson does not appear to have shared the passion which usually accompanied it, of multiplying slaves to clear and till it. He was one of the first of English-speaking statesmen with foresight enough to discover the thunders with which the dark cloud of slavery was charged, and with courage enough to warn his countrymen against them. It does not appear that he ever acquired any slaves by purchase and as an investment.

In 1767 Governor Fauquier, the colonial governor of Virginia, died. The arrival of the new governor, Baron de Botetourt, in October, 1768, was followed, according to usage, by the dismissal of the House of Burgesses, and a new election was ordered. Jefferson, offering himself as a candidate, was elected from the county of Albemarle, and continued to be annually reëlected until the House of Burgesses was closed by the Revolution. His public career began, like that of some of the greatest parliamentarians before him, in a mortifying failure. In conformity with a usage brought from the mother country of selecting one of the younger members to draft the reply to the governor's speech, this complimentary duty was devolved upon Jefferson. He confined himself too closely for the taste of the committee to the language of the resolutions which he was expected to amplify and glorify. His address was rejected, and the duty of preparing a substitute was confided to another member. This humiliation doubtless had some share in giving to his pen the parliamentary distinction usually won only by the tongue; for he was no orator—indeed, though one of the foremost members of several deliberative bodies in his time, he can fairly be said to have never made a speech.

Jefferson's legislative duties were not destined to detain him long from his profession. The king having abandoned the policy of levying internal taxes, and directed instead that a duty upon certain leading articles of foreign commerce should be levied at the customhouses in the colonies, in the spring of 1769 a messenger arrived at Williamsburg, then the seat of government of Virginia, announcing to the House of Burgesses the firm resolve of Massachusetts to resist these duties by all constitutional means, and asking the concurrence and coöperation of Virginia. On the third day of the session of the House of Burgesses four resolutions were adopted with substantial unanimity, in harmony with those adopted by Massachusetts. The first declared against taxation without representation; the second, that the colonies may concur and coöperate in seeking redress of grievances; the third, that sending accused persons away from their country for trial is an inexpressible complexity of wrong; the fourth, that they should send an address on these topics to the "father of all his people," beseeching his "royal interposition." On the following day, and without waiting for an official copy of these resolutions to reach him, Governor Botetourt dissolved the House of Burgesses.

The day after the House of Burgesses dispersed, its members met at a public hall in the Raleigh Tavern in Williamsburg, and, following the example of Massachusetts, resolved, with a near approach to unanimity—(1) to be more saving and industrious; (2) never to buy any article taxed by parliament for revenue, except low qualities of paper which they could not dispense with, nor (3) to import any article from Britain or in British ships if they could help it, until the offensive act was repealed; and (4) to save all their lambs for wool. Every man who signed the agreement was reëlected, and every man who refused lost his election.

On February 1, 1770, while Jefferson and his mother were absent from home, his house was burned down. He had, however, already begun clearing the grounds and preparing for the erection of a new residence at Monticello, which occupied no inconsiderable portion of his time and thoughts for the next two years, and which was destined to become, for more than half a century, the most distinguished seat of private hospitality in America. On January 1, 1772, he married Martha Skelton, a widowed daughter of a wealthy neighbor and associate at the bar of Williamsburg, of large fortune in lands and slaves. The lady was very handsome, childless, fond of music, twenty-three; she proved him a loving and devoted wife, and was the center of a domestic circle, the joys of which seemed only to be intensified and consecrated by the distractions of his public life.

In the spring of 1773 Jefferson was appointed by the House of Burgesses a member of "a Committee of Correspondence and Inquiry for the Dissemination of Intelligence between the Colonies." The appointment of this committee responded to the necessity then beginning to be felt by all the colonies of making common cause against the pretensions of the Crown, and looked to a convention in which their united purposes might find expression. The resolutions which gave birth to this committee provoked an immediate dissolution of the House, but its members were all reëlected. Soon after they had resumed their sittings in the following spring, news reached them of what is known in history as "The Boston Port Bill," by which the chief port of Massachusetts was to be closed to commerce on June 1st of that year (1774). The House of Burgesses thereupon set apart that day for fasting, humiliation and prayer, thereby provoking from the governor another dissolution, May 20, 1774. This immediately led to the selection of delegates from the several counties to meet at Williamsburg in August, to consider the state of the colony, and to provide for an annual congress of the colonies. Jefferson was chosen a delegate to the State Convention, but owing to sudden indisposition which overtook him on his way, was unable to attend. His influence there, however, was not to be wanting, for much of the interval between the dissolution of the House and the meeting of the Convention was devoted to the consideration and preparation of a series of instructions for the deputies who were to be sent to the General Congress, which was to meet at Philadelphia in September. In these instructions, which he had intended himself to propose, could he have been present, he maintained "that the relation between Great Britain and these colonies was exactly the same as that of England and Scotland after the accession of James and until the Union, and the same as her present relations with Hanover—having the same executive chief, but no other necessary political connection; and that our emigration to this country gave no more rights over us than the emigration of the Danes and Saxons gave to the present authorities of the mother country over England." These instructions, though too radical then for the purpose for which they were designed, were laid upon the table of the delegates, read by many, and published in a pamphlet entitled *A Summary View of the Rights of America*, and extensively circulated. It ran through edition after edition in England, after receiving such modifications (attributed to the pen of Burke) as adapted it to the purposes of the Opposition; and it procured for its author, to use his own language, "the honor of having his name inserted in a long list of proscriptions enrolled in a bill of attainder commenced in one of the two Houses of Parliament, but suppressed in embryo by the hasty course of events." This paper placed Jefferson among the leaders if not at the head of the revolutionary movement in America—events rapidly ripening in the public mind its novel and startling doctrines. The Declaration of Independence two years later, of which he asked that his tombstone should testify as the greatest achievement of his life, was but a perfected transcript of the *Summary View*.

Jefferson was the leading spirit in the succeeding sessions of the Virginia convention; he was one of a committee of thirteen appointed to report a plan for arming Virginia; he was named a delegate to the General Congress, where he took his seat eight days after Col. George Washington had been appointed by Congress commander-in-chief of the armies of the colonies;

and he was placed upon the committee to draw up a statement of the cause which had impelled the colonies to take up arms against the mother country, and upon another committee to report on Lord North's "conciliatory proposition." In the winter of 1775–76 disastrous news arrived from England. The king in opening parliament had denounced the colonists as rebels, and recommended decisive coërcive measures against them; and this was promptly followed by a law authorizing the confiscation of American vessels and cargoes, and those of all nations found trading in American ports, and the impressment of American crews into the British navy. This measure and the large vote by which it was passed instantly crystallized the colonies, and on June 11, 1776, Congress appointed Jefferson, Adams, Franklin, Sherman, and Livingston to prepare a Declaration of Independence.

Jefferson at the request of his associates prepared a draft of the Declaration, which, after two or three verbal corrections by them, was taken up for consideration in the House on July 2d. In the debate on the Declaration Jefferson took no part, "thinking it a duty to be on that occasion a passive auditor of the opinions of others, more impartial judges than he could be of its merits and demerits." Two or three expressions had been used which gave offense to some members: the words "Scotch and other foreign auxiliaries" were resented by some delegates of Scottish birth; and the strictures on the king's repeated veto of colonial laws repealing the law which permitted the slave trade were disapproved by some of the southern delegates.

On the evening of July 4, 1776, the Declaration (see INDEPENDENCE, DECLARATION OF) was reported back from the committee of the whole House, and agreed to. Circumstances have given an historical importance to this document somewhat disproportioned to its merits as a statement of the grievances of the colonies; for it came to be the weapon that dismembered a great empire, and that gave birth to a nation of unlimited possibilities; it gave guarantees for the fame of its author which are possessed by no other production of an American pen; for more than a century it has been read to assembled multitudes in every considerable town in the United States on the anniversary of its adoption; and its style and sentiments have been the model for every people which since that time has sought to assert for itself the right of self-government.

Jefferson continued to participate actively in the efforts to organize the government of the confederation and prepare it for the life-and-death struggle which was impending, until September 2d, when he resigned to take his seat in the Legislature of Virginia, to which he had been elected, and where he thought his services would be most needed. "When I left congress in '76," he says in his autobiography, "it was in the persuasion that our whole code must be reviewed, adapted to our republican form of government, and, now that we had no negatives of councils, governors or kings to restrain us from doing right, that it be corrected in all its parts with a single eye to reason and the good of those for whose government it was framed." To this task he now devoted himself. Of the various measures introduced in furtherance of this purpose he says: "I considered four, passed or reported, as forming a system by which every fiber would be eradicated of ancient or future aristocracy, and a foundation laid for a government truly republican." These were: the repeal of the laws of entail, the abolition of primogeniture and equal partition of inheritances, the restoration of the rights of conscience and relief of the people from taxation for the support of a religion not theirs, and a system of general education. He tried to add to these, but without success, the introduction of trial by jury into the courts of chancery, and to provide for the gradual emancipation of the slaves. He did, however, introduce a bill, which passed without opposition, forbidding the further importation of slaves into the state—the only important change effected in the slave system of Virginia during the revolutionary period. The importance he attached to his work in Virginia at this time he showed by resigning his seat in Congress and by declining the appointment tendered him by Congress, in 1776, to go with Franklin to Paris to assist in negotiating treaties of commerce and alliance with France.

In the third year of the war (1779), and just as the darkest and most threatening clouds were gathering over Virginia, Jefferson was elected governor. The enemy had decided to carry the war into the south. The commonwealth was almost defenseless, all her military resources having been exhausted in sustaining Washington's policy of driving the enemy out of the north. Arnold entered Richmond, recently become the capital, on January 5, 1781, and ravaged the place. The Legislature, which had taken refuge at Charlottesville, were pursued and dispersed by Tarleton, who immediately sent a party to capture Jefferson at Monticello. He narrowly escaped, his pursuers being in sight of him as he mounted his horse and rode off to join his family. Though Monticello was spared by Tarleton's order, Jefferson's estate of Elk Hill, on the James river, was less fortunate. It was completely despoiled by the orders of Cornwallis.

In 1782 he was summoned by Congress to act as one of the plenipotentiaries to negotiate a treaty of peace with the mother country, but the business was found to be so far advanced before he was ready to sail that his appointment was recalled, and we find him at the following winter session again occupying his seat in Congress, where, as chairman of the committee to which it was referred, he reported the definitive treaty of peace with England. At the succeeding session he introduced an elaborate report, and secured the adoption of the system of coinage which is still in vogue in the United States. In the same session he drafted the report of a plan for the government of the vast territory lying to the northwest of the Ohio river, which Virginia had ceded to the Federal Government in 1780.

In 1784 Jefferson was again commissioned by Congress as minister plenipotentiary, this time to assist Franklin and Adams in negotiating treaties of commerce with European states. He joined his associates in Paris in July. The mission upon which he was sent proved somewhat premature. Jefferson, wisely judging that fuller and more correct information about America must precede any successful attempts to deal with European states to advantage, printed at his own expense, and distributed among his friends, some *Notes on Virginia*, which he had prepared two years before.

In January, 1785, Doctor Franklin, after eight years' residence at the French court, pressed his application to be relieved, and Jefferson was selected, as he gracefully put it in presenting his letters of credence, "to succeed him, for no one could *replace* him." Jefferson was exceedingly popular as a minister, and was fortunate in securing several important modifications of the French tariff in the interests of American commerce.

In the summer of 1789 Washington, who had been elected president of the United States under the new constitution, gave Jefferson leave of absence, and soon after his arrival in America, "as well from motives of private regard as a conviction of public propriety," tendered him the office of secretary of state. Reluctant as Jefferson was to leave Paris, he yielded at once to the wishes of the president, and entered upon the duties of his new office in March, 1790. Alexander Hamilton, who was the head of the Federal party as distinguished from the Democratic, of which Jefferson was the most conspicuous representative, was appointed the secretary of the treasury. They represented the two great schools of political thought which contended for mastery in American politics, not only during Washington's administration, but for the succeeding sixty years, and until their differences were merged in the graver and more absorbing issues that grew out of the conflict between free and servile labor. Jefferson was an advocate of State sovereignty and of decentralization. He was strongly opposed to the leading features of the British constitution, and in cordial sympathy with the new school of politics which had recently begun to be felt in the government of France. His five years' residence in that country had greatly strengthened him in these views, and they more or less affected his treatment of all questions that came before him as a cabinet minister. Hamilton's great fear, on the other hand, was that the central government under the new constitution would be too weak, and he favored all measures that tended to exalt and strengthen the executive, and to bring the government more in harmony with that of England. Washington very prudently gave the preference to the partisan of neither theory, though his sympathies were supposed to be more frequently with the Federal than with the Republican leader.

The most perplexing questions which occupied Jefferson's attention as secretary of state grew out of the war declared by France in 1793 against Holland and Great Britain. What should be the neutral policy and what were to be insisted upon as the neutral rights of the United States? Upon this question both parties put forth their whole strength. The republicans, under Jefferson's lead, pretty generally sympathized with the French, and were inclined to authorize privateers to be fitted out in American ports to cruise against English vessels. This policy was energetically resisted by the Federalists, who were for peace with all and entangling alliances with none. Jefferson advocated the propriety of receiving a diplomatic representative from the French republic. In this his advice prevailed, and Genest was promptly sent as minister. With more zeal than discretion he proceeded at once to fit out privateers, and empower French consuls in the United States to organize courts of admiralty to condemn prizes. This led to heated discussions in the cabinet, and finally to the recall of Genest. Partly from discontent with a position in which he did not feel that he enjoyed the absolute, which meant pretty much the exclusive, confidence of the president, and partly because of the embarrassed condition of his private affairs, due mainly to the ravages of war, Jefferson resigned his seat in the cabinet December 31, 1793, and retired to Monticello. There he remained till the fall of 1796, when he was made Vice-President at the election which called John Adams to the presidency. The duties of this position being limited to presiding over the senate during its sessions, Jefferson spent most of the four years of his official term in improving his estate, and by his counsels directing the policy of the party of which he was the acknowledged leader. The excesses of the Reign of Terror had worked a formidable reaction in America against the sympathizers with revolutionists in France. This, with the aggressive policy of the Directory, and the insulting reception given to the American envoys in Paris, for a time paralyzed the Republican (Democratic) party. President Adams, mistaking the resentment felt in the United States toward France for a popular reaction against republicanism, was betrayed into a series of ill-considered measures, which were not long in telling upon the fortunes of his party. Among these measures the worst were the alien and sedition laws, the former empowering the president to expel from the country such aliens as he should deem dangerous, and the latter punishing as sedition, with fine and imprisonment, the printing or uttering malicious charges against the President or Congress. The Republicans commenced an active agitation against the laws throughout the country, which, coöperating with a strong and popular sympathy with the Republican doctrines, finally resulted in the election of Jefferson and Burr, the candidates of the Republican party, as President and Vice-President, and the defeat of Adams and Pinckney, the candidates of the Federalists, Washington having died only a few months before; this election proved the *coup de grace* of the Federal party, and established Jeffersonian Republicanism as the permanent policy of the country. Jefferson entered upon the duties of the presidency on March 4, 1801, and was reëlected for the term commencing March 4, 1805, by 143 out of 176 electoral votes. His administration of twice four years was characterized by the simplicity which distinguished his conduct in private life. He eschewed all pomp and ceremony designed artificially to distinguish the President from the people. His dress "was of plain cloth" on the day of his inauguration. Instead of driving to the capital in a coach and six as had been the practice, he rode there on horseback, without a guard or even a servant in his train, dismounted without assistance, and hitched the bridle of his horse to a fence. Instead of opening Congress in the English fashion, with a speech to which a formal reply was expected, he sent his message by a private hand. Court etiquette was practically abolished, and the weekly levee with it. The code of precedence was essentially modified. Titles of honor were not recognized as such. "Excellency," "Honorable," and even "Mr." were distasteful to him. Between the President and Governors of States he recognized no difference in rank, each being the supreme head of an independent State. "If it be possible," he said, "to be certainly conscious of anything, I am conscious of feeling no difference between writing to the highest and lowest being on earth."

In public official station he regarded himself purely as a trustee for the public. He discontinued the practice of sending ministers abroad in government vessels, nor would he have his birthday celebrated by state balls; he refused to appoint days of fasting and thanksgiving on the ground that they were religious rites, and no recommendation from him, therefore, could make them more or less binding upon the conscience. To secularize and republicanize the government were the paramount purpose and the distinguishing feature of his administration. His cabinet, of which Madison and Gallatin were the pillars, was in thorough sympathy with Jefferson in his general policy, and its perfect harmony was uninterrupted. He gave his ministers his entire confidence. "If I had the world to choose from," he once said, "I could not change one of my associates to my better satisfaction." The first important act of his administration was to send four of the six vessels constituting the so-called navy of the republic to the Mediterranean to exterminate the Algerian pirates, who for half a century had preyed upon the commerce of the world, thus initiating a series of events which in a few years rendered the commerce of the Mediterranean as safe as that of the English Channel. Possessed with a conviction of the supreme commercial importance of New Orleans, he directed negotiations to be opened with the French Government, which resulted in the purchase for $15,000,000 of the Territory of Louisiana, which had been ceded by Spain to France. Though the constitutional power under which this important transaction was consummated was far from clear, neither its validity nor its wisdom was ever seriously questioned; and it is now justly regarded by his countrymen as the crowning achievement of his administration, and none the less meritorious for the responsibility he deliberately assumed in bringing it to pass. The remainder of his administration derives most of its historic importance from his unsuccessful attempt to convict Aaron Burr, the late Vice-President, of having engaged in treasonable projects in the southwest, and from his efforts to maintain, without war, the rights of neutrals on the high seas. Among the less conspicuous though scarcely less important measures of his administration were the careful exploration of the Western Territories; reducing the public debt, and practically extirpating from the country the then not unpopular delusion that a national debt is a national blessing; fortifying the seaports; reorganizing and rearming the militia; diminishing the taxes; and extinguishing the Indians' titles by fair purchase, and promoting their emigration beyond the Mississippi. On March 4, 1809, he retired from the presidency, after an almost continuous public service of over forty years. He was pressed to allow himself to be reëlected for a third term, but refused unconditionally, though the legislatures of five States formally requested him to be a candidate.

Jefferson, whose private fortune had been seriously compromised by the interruptions of foreign commerce before and during his administration, and by the expenses incident to his representative position, lived seventeen years after his retirement, and to the last was the most considerable personage in the United States. His immediate successors in the presidency for the next sixteen years were his pupils and devoted personal friends, and rarely ventured upon any important step without the support of his approval. The employments of his closing years were in harmony with the dignified and patriotic purposes of his active life. Nothing that concerned the welfare of the country was a matter of indifference to him. He urged successfully the foundation of a university, and became one of its most efficient trustees. His correspondence during this period is regarded as one of the most interesting and instructive contributions to the early literature of the United States. He had inherited a wonderful constitution and herculean strength, neither of which did he ever abuse

In the spring of 1826 the decline of his strength, which had been gradually increasing for two or three years, became more rapid, and on July 4th he expired, in the eighty-third year of his age. John Adams, his predecessor in the presidency, by an impressive coincidence, died on the same day—the fiftieth anniversary of an event imperishably associated with the names of both and with the fortunes of a nation.

JEFFERSON CITY, the capital of the State of Missouri, and the county seat of Cole county, is situated on the bluffs above the Missouri river, 125 miles west of St. Louis. It is a handsome city, surrounded by hills, and contains several important public buildings beside the State House and the executive mansion. It has several hotels, many churches and schools, and contains three banks and some factories. The State penitentiary, containing 1,500 convicts, is located here. Jefferson City has first-class railroad communication and is well lighted with gas and electric light. Its city property is valued at $1,500,000, and the city debt is $50,000. The town was settled in 1820, became the seat of the State government in 1826, and was incorporated as a city in 1839. Its population (1900) was 9,664.

JEFFERSONVILLE, the county seat of Clark county, Ind., is situated on the north bank of the Ohio river. The streets are of a uniform width of sixty feet. The falls of the Ohio afford a fine water-power, so that manufactories are numerous. Among them are locomotive and car works, plate-glass works, two shipyards, and railway machine shops. The Southern State penitentiary and an extensive government depot of army supplies are situated here. Population (1900), 10,774.

JEFFREY, FRANCIS, a judge in the Scottish Court of Session, with the title of Lord Jeffrey, was born at Edinburgh, October 23, 1773. After attending the high school six years, he studied at the university of Glasgow from 1787 to May, 1789, and at Oxford from September, 1791, to June, 1792. Having in the following winter begun the study of law at Edinburgh University, he became a member of the Speculative Society, in the debates of which he measured himself not disadvantageously with Scott, Brougham, Francis Horner, the marquis of Lansdowne, Lord Kinnaird, and others. He was admitted to the bar on December 18, 1794, but, having abandoned the Tory principles in which he had been educated, he, of course, found his father's connection of little advantage to him; indeed, the adoption of Whig politics was at this time almost a complete obstacle to legal success. To the proposal made by Sydney Smith in Jeffrey's house to a company of young men, none of whom had yet achieved fame or occupied any professional position of importance, that they should start a review, Jeffrey was accordingly prepared to give a favorable reception; and, the scheme being received with acclamation, the result was the appearance on October 10, 1802, of the first number of the *Edinburgh Review*. At the outset the *Review* was not under the charge of any special editor. The first three numbers were, however, practically edited by Sydney Smith, and on his leaving for England the work devolved chiefly on Jeffrey, who, after an arrangement with Constable, the publisher, was appointed editor at a fixed salary. Most of those associated in the undertaking were Whigs in their political convictions; but, although the general bias of the *Review* was toward social and political reforms, it was so little of a party organ that for a time it numbered Sir Walter Scott among its contributors; and no distinct emphasis was given to its political leanings until the publication in 1808 of an article on the work of Don Pedro Cevallos on the *French Usurpation of Spain*, which led shortly afterward to the appearance of the rival *Quarterly*. According to Lord Cockburn, the effect of the first number of the *Edinburgh Review* was "electrical," and it is not difficult to understand why it should have been so, for, if its learning was far from being so omniscient as was then imagined, and if much of its speculation was superficial and rambling, and its literary criticisms greatly deficient in true subtilty and discernment, it certainly did not err on the side either of modesty or of dullness. The period of Jeffrey's editorship extended to about twenty-six years, having ceased with the ninety-eighth number, published in June, 1829.

Jeffrey's own contributions, according to a list which has the sanction of his authority, numbered two hundred, all except six being written before his resignation of the editorship, and two immediately subsequent to this.

Notwithstanding the increasing success of the *Review*, Jeffrey always continued to look to the bar as the chief field of his ambition, and, indeed, he soon experienced that his literary reputation was a help and not an obstruction to professional advancement. Probably but for his rapid utterance and affected accent, his weak physique, and his too copious command of language, he might have attained to the highest rank as an orator. Jeffrey was twice—in 1820 and 1822—elected lord rector of the university of Glasgow. In 1829 he was chosen dean of the faculty of advocates. On the Whigs obtaining office in 1831, he became lord advocate, and entered parliament as member for the Perth burghs. After the passing of the Reform Act, in the framing of which measure he had the principal charge, so far as it related to Scotland, he was returned for Edinburgh; but his parliamentary career, which, though not so brilliantly successful as some expected, had won him high general esteem, was terminated by his elevation to the judicial bench as Lord Jeffrey in May, 1834. He died at Edinburgh, June 26, 1850.

JEFFREYS, George Jeffreys, Lord, lord chancellor of England, was born probably in 1648, at Acton in Denbighshire. He spent some time at Westminster school before entering the Inner Temple as a student at sixteen. The allowance he received from home was quite unequal to the demands of the dissolute habits into which he quickly fell, but it is said that the promise of future eminence, afforded by the fits of studiousness which divided his orgies, procured for the dissipated student both long credit and presents of money. He was exceedingly popular as a table companion, especially with the inferior attorneys and attorneys' clerks with whom, then as afterward, he preferred to drink; and in the low practice which he began at Old Bailey and the London Sessions immediately on being called to the bar in November, 1668, he found his boon companions very useful in procuring him briefs. Voluble, unscrupulous, and overbearing, he rapidly developed, in his constant dealings with the most degraded criminals, the coarse, bullying manner which disgraced him throughout his whole career. He sought every means of ingratiating himself with the city aldermen, and in 1671, at the singularly early age of twenty-three, became their common serjeant, and in 1678 recorder of London. He had by that time pushed his way into the higher courts, where his marvelous address in speaking and cross-examination made up for, if it did not conceal, his shallow legal knowledge. Jeffreys had hitherto nominally belonged to the anti-court or liberal party; but, perceiving that they had but little patronage in their gift, he had opened secret negotiations with Charles II., and immediately on taking the oaths as recorder he openly declared himself a partisan of the court. The year before he had been knighted and appointed solicitor to the duke of York. To reward him for the servility which he displayed, especially in connection with the Popish plot trials, he was appointed chief-justice of Chester, and advanced to a baronetcy. His insolence and intemperance, already notorious, became in his chief-justiceship well-nigh intolerable. He received a rebuff in 1680 when for his conduct in obstructing the assembling of parliament he was reprimanded on his knees by the speaker, and forced to resign his recordership in December of the same year. Such indignities were merits in the eyes of the king, to whose favor Jeffreys laid additional claims by his efforts to abrogate the charter of London, and by his activity as counsel against the suspected Rye House conspirators. He received his reward. Lord Campbell remarks, "Jeffreys became chief-justice of England, as the only man fit to condemn Algernon Sidney." He was sworn in in November, 1683, and shortly became privy councilor and member of the cabinet. In the court of the King's Bench, the new chief-justice let few considerations stand between him and his desire to satisfy the king. His iniquitous servility is to be traced in the *State Trials*. When Charles died in February, 1685, Jeffreys exchanged a master who disliked him as a wretch "with no learning, no sense, no manners, and more impudence than ten carted street-walkers," for one who found in him a thoroughly congenial tool. In May, 1685, Jeffreys was raised to the peerage by the style of Baron Jeffreys of Wem, and in August went into the western counties as president of a special commission appointed to try the numerous cases of treason arising from the duke of Monmouth's ill-fated rebellion. It was in this "bloody assize" that he was to deepen the stain that already tarnished his fame, and to make the name "Judge Jeffreys" a synonym for a monster of bloodthirsty cruelty, blasphemous rage, and brutish intemperance. In the "campaign" he gave the rein to his ferocity; he was maddened with slaughter, and his appetite for blood grew by what it fed on. The horrible glare of his eye, the savage lines of his face, his fierce shouts of wrath, terrified and confused guilty and innocent alike. With hateful cunning he let it be bruited that the only hope of mercy lay in pleading guilty, and by this cold-blooded artifice lightened his labors. He had a powerful incentive to active butchery; the vacant post of lord chancellor was to be won by good service. The estimates of the numbers of victims of the commission vary: 320 was the official return to the treasury; Lord Lonsdale says 700, and Burnet 600. Upward of 800 were transported as slaves to the West Indies, while others only escaped by purchasing their pardons from the judge at most exorbitant rates. When the chief-justice returned to Windsor in September, the great seal of England was placed in his blood-stained hands. For the rest of his career the lord chancellor was an unresisting agent of King James in his most illegal schemes. Finding himself losing favor at court, he even revived the ecclesiastical court of high commission, abolished in 1640 by an act which forbade its revival, and himself engaged to act as president. In the attempt against the rights of the fellows of Magdalen College, Oxford, and in the trial of the seven bishops, Jeffreys was the king's right hand; but, when the proceedings of James had at last roused the indignation that cost him his crown, the lord chancellor was one of the first to advise concession. When the king fled in 1688 Jeffreys was in the utmost consternation. For him, he knew, there could be no mercy. Shaving off his shaggy eyebrows, and disguising himself as a common sailor, he attempted to escape to Hamburg in a small collier, but, while drinking in a low public house at Wapping, he was recognized by a poor scrivener who had once encountered the wrath of the judge, and had never forgotten the glare of his eye. Jeffreys was only saved from being torn in pieces by the mob by the timely arrival of a strong guard, who conducted the trembling wretch to the Tower. There he lay some months, tortured by anguish both of mind and body, which he endeavored to drown in copious draughts of brandy. He died miserably on April 19, 1689. Jeffreys was twice married, and had ten children, but his title became extinct in 1703, in the person of his son John, notorious for having interrupted the funeral of Dryden.

JEHOL, or Cheng-te-fu, a city of Mongolia, famous as the seat of the summer palace of the emperor of China, is situated about 140 miles northeast of Peking, with which it is connected by an excellent line of road. Population, 10,000.

JEHOVAH is the current European transcription of the sacred tetragrammaton *J H V H*. This was punctuated by the Massoretes with the vowels *ĕ* (for *ă*), *ō*, *ā* of the word Adonai which the later Jews habitually substituted in reading the ineffable name. It is now generally agreed that Jahwé (Yahwé) is the true pronunciation, a conclusion which is supported not only by the linguistic argument derived from the fact that the various contracted forms in which the name appears, either separately (Jah) or in compound proper names (Jô, Jĕho, Jāhu), are all reducible to Jahw, but also by the testimony of ancient tradition. The name may be translated as meaning "He who causes to be." The vague "I will be what I will be" (the emphasis lying on the first verb as in Exod. xxxiii. 19) is used to convey the idea of that all-sufficiency of God's grace, which is wider than the widest faith.

JEJEEBHOY, Sir Jamsetjee, a Parsee merchant and great public benefactor, was born of poor parents in Bombay, July 15, 1783. He rose to be one of the most opulent Parsee merchants in India. His lavish benevolence, which recognized no difference of nation, sect, or class, and extended even to the brute creation, has won him enduring honor. In 1822 he paid the debts of all the poor debtors in Bombay jail; he enriched his native city with a hospital and an educational establishment for Parsee children, a school of art and other benevolent institutions, and contributed largely to the Grant Medical College, while to the public works at Bombay, Nowsaree, and elsewhere he gave large grants, as well as to the patriotic fund and the Indian sufferers' fund after the mutiny. Eleven schools owe their foundation to his munificence, in which 2,710 Parsee children are educated. It is estimated that he gave away upward of 26 lacs of rupees. Knighted in 1842, he was promoted to a baronetcy in 1857; a statue was voted to him in 1856, and was unveiled in Bombay town-hall on August 1, 1859. At his death on April 15, 1859, his property was estimated at 8,550,000 rupees.

JELÁL-ED-DÍN, Mohammed er-Rúmí (born at Balkh *c.* 1200 A.D., died at Iconium, 1273, as head of a college for mystic theology), one of the greatest poets and thinkers of Persia. (See Persia.)

JEMMAPES, or Jemappes, a village in the arrondissement and three miles west of the town of Mons, in the province of Hainault, Belgium, is situated on the Haine, near the "Bassin du Flenu," one of the richest coalfields in the province. It has manufactures of mining gear, salt, soap, brass, and leather. The population of the commune in 1900 was about 13,000.

JENA, a town in the department of Apolda, in the grand-duchy of Saxe-Weimar-Eisenach, Germany, is situated about fifty-six miles southwest of Leipsic by rail, at the junction of the Leutra and Saale, in a beautiful valley, surrounded by romantic hills, and dotted over with villages. The town is tolerably well built, though the houses are quaint, and many of the streets narrow. Besides the university buildings, the more interesting edifices are the fifteenth century church of St. Michael, with a tower 318 feet high, and containing the bronze statue of Luther, originally intended for his tomb; the college-church; the library; the old-fashioned town-house in the market-place; the castle, built in 1620, where Goethe wrote his *Hermann und Dorothea;* the Black Bear tavern (now a hotel), where Luther spent the night after his flight from Wartburg; and Weigel's house. In 1858, tercentenary of the inauguration of the university, the various houses in Jena that had been occupied by illustrious men were marked by memorial tablets. The town owes what prosperity it now has to the presence of the university founded by the elector, John Frederick of Saxony, whose statue stands in the market-place. In 1547 that prince, while a captive in the hands of Charles V., conceived the plan of erecting a university at Jena, in place of that of Wittenberg, which he had forfeited. The academy, founded accordingly at Jena in 1548 by the elector's three sons, obtained the necessary charter from the emperor Ferdinand I., and on February 2, 1558, was formally inaugurated as a university. The students were most numerous about the middle of the eighteenth century, when some 3,000 attended; but the most brilliant professoriate was under Duke Karl August, Goethe's patron (1787–1806), when in the different faculties Reinhold, Fichte, Schelling, Hegel, Schlegel, Oken, and Schiller read lectures. Founded as a home for the new religious opinions of the sixteenth century, Jena has always liberally granted a hearing to new teaching. In the session of 1900–01 the teaching staff numbered 103 members; in the winter session of 1901–02 the students numbered, in all departments, about 775. Among the numerous auxiliaries of the university may be mentioned the library with 180,000 volumes; the seminaries of philology, theology, and education; the institutes for chemistry, pharmacy, zoölogy, botany (with a botanical garden), and meteorology; the veterinary and agricultural institutions; and the various physical and archæological collections, which now occupy the castle. A clinical institute and the several hospitals assist the study of medicine.

In modern times Jena has been made famous by the defeat inflicted in the vicinity, on October 14, 1806, by Napoleon upon the Prussian army under the duke of Brunswick. Population (1901), about 12,000.

JENGHIZ KHAN, Mongol emperor, was born in a tent on the banks of the river Onon, in 1162. His father Yesukai was absent at the time of his birth, being engaged in a campaign against a Tartar chieftain named Temuchin. In this conflict the fortune of war favored the side of Yesukai, who having slain his enemy returned to his encampment in triumph. Here he was met by the news that his wife Yulun had given birth to a son. On examining the child he observed in its clenched fist a clot of coagulated blood like a red stone. In the eyes of the superstitious Mongol this circumstance took the shape of a mysterious reference to his victory over the Tartar chieftain, and he therefore named the infant Temuchin. The death of Yesukai, which placed Temuchin, who was then only thirteen years old, on the Mongol throne, was the signal also for the dispersal of several tribes whose allegiance the old chieftain had retained by the exercise of an iron rule. Temuchin succeeded in holding his ground against the insidious plots and open hostilities of the neighboring tribes, more especially of the Naimans, Keraits, and Merkits. With one or other of these he maintained an almost unceasing warfare until the year 1206, when his power was so firmly established that he felt the time had arrived when he might proclaim himself the ruler of an empire. He therefore summoned the notables of his kingdom to an assembly on the banks of the Onon, and at their unanimous request adopted the name and title of Jenghiz Khan (Chinese, Ching-sze, or "perfect warrior"). At this time there remained to him but one open enemy on the Mongolian steppes, namely, Polo the Naiman khan. Against this chief he now led his troops, and in one battle so completely shattered his forces that Kushlek, the successor of Polo, who was left dead upon the field, fled with his ally Toto, the Merkit khan, to the river Irtish. Having thus further consolidated his sovereignty, Jenghiz Khan now meditated an invasion of the empire of the Kin Tartars, who had wrested northern China from the emperors of the Sung dynasty. After having defeated the Kin army under the leadership of a son of the sovereign, he captured the Wu-leang-hai Pass in the Great Wall, and penetrated as far as Ning-hea Fu in Kansuh. With unceasing vigor he pushed on his troops into the country, and even established his sway over the province of Leaou-tung. The saying that nothing succeeds like success was eminently true in his case. Several of the Kin commanders, seeing how persistently victory attended his banners, deserted to him and garrisons surrendered at his bidding. Having thus secured a firm footing within the Great Wall, he despatched three armies in the autumn of 1213 to overrun the empire. Complete success attended all three expeditions. The right wing advanced as far as Honan, and after having captured upward of twenty-eight cities rejoined headquarters by the great western road. Hochar made himself master of the country as far as Leaou-se; and Jenghiz ceased his triumphal career only when he reached the cliffs of the Shan-tung promontory.

While Jenghiz was thus adding city to city and province to province in China, Kushlek, the fugitive Naiman chief, was not idle. With characteristic treachery he requested permission from his host, the Khitan khan, to collect the fragments of his army which had been scattered by Jenghiz at the battle on the Irtish, and thus having collected a considerable force he leagued himself with Muhammed, the shah of Khuarezm, against the confiding khan. After a short but decisive campaign the allies remained masters of the position, and the khan was compelled to abdicate the throne in favor of his late guest.

With the power and prestige thus acquired, Kushlek prepared once again to measure swords with the Mongol chief. On receiving the news of his hostile preparations Jenghiz at once took the field, and in the first battle routed the Naiman troops and made Kushlek a prisoner. A short shrift was given to the treacherous Naiman, and his ill-gotten kingdom became an appanage of the Mongol empire. Jenghiz now held sway up to the Khuarezm frontier. In the spring of 1219 Jenghiz set out from Karakoram on a campaign which was destined to be as startling in its immediate results as its ulterior effects were far reaching. The invading force was in the first instance divided into two armies: one, commanded by Jenghiz's second son Jagatai, was directed to march against the Kankalis, the northern defenders of the Khuarezm empire; and the other, led by Juji, his eldest son, advanced by way of Sighnak against Jend. Against this latter force Muhammed led an army of 400,000 men, who after a bloody battle with the invaders were completely routed, leaving, it is said, 160,000 dead upon the field. With the remnant of his host Muhammed fled to Samarkand. Meanwhile Jagatai marched down upon the Jaxartes by the pass of Taras and invested Otrar, the offending city. After a siege of five months the citadel was taken by assault, and Inaljuk and his followers were put to the sword. To mark their sense of the crime of which it had been the scene, the conquerors leveled the walls with the ground, after having given the city over to pillage. At the same time a third army besieged and took Khogend on the Jaxartes; and yet a fourth, led by Jenghiz and his youngest son Tulé, advanced in the direction of Bokhara. Tashkend and Nur surrendered on their approach, and after a short siege Bokhara fell into their hands. On entering the town Jenghiz ascended the steps of the principal mosque, and shouted to his followers, "The hay is cut; give your horses fodder." No second invitation to plunder was needed; the city was sacked, and the inhabitants either escaped beyond the walls or were compelled to submit to infamies which were worse than death. As a final act of vengeance the town was fired, and before the last of the Mongols left the district, the great mosque and certain palaces were the only buildings left to mark the spot where the "center of science" once stood. From the ruins of Bokhara Jenghiz advanced along the valley of the Sogd to Samarkand, which, weakened by treachery, surrendered to him, as did also Balkh. But in neither case did submission save either the inhabitants from slaughter or the city from pillage. As soon as sufficient reënforcements arrived Jenghiz advanced against Jalâluddîn, who had taken up a position on the banks of the Indus. Here a desperate battle was fought. The Turks, though far outnumbered, defended their ground with undaunted courage, until, beaten at all points, they fled in confusion. Jalâluddîn, seeing that all was lost, mounted a fresh horse and jumped into the river, which flowed twenty feet below. From the Indus Jenghiz sent in pursuit of Jalâluddîn, who fled to Delhi, but failing to capture the fugitive the Mongols returned to Ghazni after having ravaged the provinces of Lahore, Peshawur, and Melikpoor. At this moment news reached Jenghiz that the inhabitants of Herat had deposed the governor whom Tulé had appointed over the city, and had placed one of their own choice in his room. To punish this act of rebellion Jenghiz sent an army of 80,000 men against the offending city, which after a siege of six months was taken by assault. For a whole week the Mongols ceased not to kill, burn, and destroy, and 1,600,000 persons are said to have been massacred within the walls. Having consummated this act of vengeance, Jenghiz returned to Mongolia by way of Balkh, Bokhara, and Somarkand.

In China the same success had attended the Mongol arms as in western Asia. The whole of the country north of the Yellow river, with the exception of one or two cities, was added to the Mongol rule, and, on the death of the Kin emperor Seuen Tsung in 1223, the Kin empire virtually ceased to be, and Jenghiz's frontiers thus became conterminous with those of the Sung emperors who held sway over the whole of central and southern China. After his return from central Asia, Jenghiz once more took the field in western China. While on this campaign the five planets appeared in a certain conjunction which to the superstitiously minded Mongol chief foretold that evil was awaiting him. With this presentiment strongly impressed upon him he turned his face homeward, and had advanced no farther than the Se-Keang river in Kansuh when he was seized with an illness of which he died a short time afterward (1227) at his traveling palace at Ha-laou-tu, on the banks of the river Sale in Mongolia.

Thus ended the career of one of the greatest conquerors the world has ever seen. Born and nurtured as the chief of a petty Mongolian tribe, he lived to see his armies victorious from the China Sea to the banks of the Dnieper; and, though the empire which he created ultimately dwindled away under the hands of his degenerate descendants, leaving not a wrack behind, we have in the presence of the Turks in Europe a consequence of his rule, since it was the advance of his armies which drove their Osmanli ancestors from their original home in northern Asia, and thus led to their invasion of Bithynia under Othman, and finally their advance into Europe under Amurath I.

JENNER, Edward, the discoverer of vaccination, was born at Berkeley, Gloucestershire, on May 17, 1749. He received his early education in local schools at Wotton-under-Edge and Cirencester, where he already showed a strong taste for natural history. The medical profession having been selected for him, he began his studies under Mr. Ludlow, a surgeon of Sodbury near Bristol; but in his twenty-first year he proceeded to London, where he became a favorite pupil of the celebrated John Hunter, in whose house he resided for two years. During this period he was employed by Sir Joseph Banks to arrange and prepare the valuable zoological specimens which he had brought back from Captain Cook's first voyage in 1771. He must have acquitted himself satisfactorily in this task, since he was offered the post of naturalist in the second expedition, but declined it as well as other advantageous offers, preferring rather to practice his profession in his native place, and near his eldest brother, to whom he was much attached. His speedy success in practice did not engross his intellectual activity. He was the principal founder of a local medical society, to which he contributed several papers of marked ability, in one of which he apparently anticipated later discoveries concerning the rheumatic inflammations of the heart. In 1792 he resolved to confine himself to practicing as a physician, and accordingly obtained the degree of doctor of medicine from St. Andrews. Finding that Berkeley could not support a physician, he began, a few years later, to visit Cheltenham annually.

Meanwhile the discovery that was to immortalize his memory had been slowly maturing in his mind. When only an apprentice at Sodbury, his attention had been directed to the relations between cowpox and smallpox in connection with a popular belief which he found current in Gloucestershire, as to the antagonism between these two diseases. During his stay in London he appears to have mentioned the thing repeatedly to Hunter, who, being engrossed by other important pursuits, was not so strongly persuaded as Jenner was of its possible importance, yet spoke of it to his friends and in his lectures. His first careful investigation of the subject dates from about 1775, and five years elapsed before he had succeeded in clearing away the most perplexing difficulties by which it was surrounded. He first satisfied himself that two different forms of disease had been hitherto confounded under the term "cowpox," only one of which protected against smallpox, and that many of the cases of failure were to be thus accounted for; and his next step was to ascertain that the true cowpox itself only protects when communicated at a particular stage of the disease. At the same time he came to the conclusion that "the grease" of horses is the same disease as cowpox and smallpox, each being modified by the organism in which it was developed—an opinion which is generally held at the present day. For many years, cowpox being scarce in his county, he had no opportunity of inoculating the disease, and so putting his discovery to the test, but he did all he could in the way of collecting information and communicating what he had ascertained. Thus in 1788 he carried a drawing of the cowpox, as seen on the hands of a milkmaid, to London, and showed it to Sir E. Home and others, who agreed that it was "an interesting and curious subject," but by no means realized its practical importance. At length, on May 14, 1796, he was able to inoculate James Phipps, a boy about eight years old, with cowpox matter. On the first of the following July the boy was carefully inoculated with variolous matter, but (as Jenner had predicted) no smallpox followed. The discovery was now complete, but he desired to act without precipitation, and was unable to repeat his experiment until 1798, owing to the disappearance of cowpox from the dairies. He then repeated his inoculations with the utmost care, and prepared a pamphlet which should announce his discovery to the world. Before publishing it, however, he thought it well to visit London, so as to demonstrate the truth of his assertions to his friends; but he remained in London nearly three months, without being able to find any person who would submit to be vaccinated. Soon after he had returned home, however, Mr. Cline, an eminent surgeon, inoculated some vaccine matter over the diseased hip-joint of a child, thinking the counter-irritation might be useful, and found the patient afterward incapable of acquiring smallpox. In the autumn of the same year, Jenner met with the first opposition to vaccination; and this was the more formidable because it proceeded from Doctor Ingenhousz, a celebrated physician and man of science. But meanwhile Mr. Cline's case, and his advocacy of vaccination, brought it much more decidedly before the medical profession, of whom the majority were prudent enough to suspend their judgment until they had more ample information. But besides these there were two noisy and troublesome factions, the one which opposed vaccination as a useless and dangerous practice, while the other endangered its success much more by their rash and self-seeking advocacy. At the head of the latter was one Doctor Pearson, who in November, 1798, published a pamphlet speculating upon the subject, before even seeing a case of cowpox, and afterward endeavored, by lecturing on the subject, and supplying the virus, to put himself forward as the chief agent in the cause. The matter which he distributed, which had been derived from cows that were found to be infected in London, was found frequently to produce, not the slight disease described by Jenner, but more or less severe eruptions resembling smallpox. Jenner concluded at once that this was due to an accidental contamination of the vaccine with variolous matter, and a visit to London in the spring of 1799 convinced him that this was the case. In the course of this year the practice of vaccination spread over England, being urged principally by nonprofessional persons of position; and toward its close attempts were made to found institutions for gratuitous vaccination and for supplying lymph to all who might apply for it. Pearson proposed to establish one of these in London, without Jenner's knowledge, in which he offered him the post of honorary corresponding physician! On learning this scheme to supplant him, and to carry on an institution for public vaccination on principles which he knew to be partly erroneous Jenner once more visited London early in 1800, when he had influence enough to secure the abandonment of the project. He was afterward presented to the king, the queen, and the prince of Wales, whose encouragement materially aided the spread of vaccination in England. Meanwhile it had made rapid progress in the United States, where it was introduced by Doctor Waterhouse, the professor of physic at Cambridge, Mass., and on the continent of Europe, where it was at first diffused by Doctor de Carro of Vienna, who practiced it with the greatest zeal and discretion, and thence spread to Geneva. In consequence of the war between England and France, the discovery was later in reaching Paris; but, its importance once realized, it spread rapidly over France, Spain, and Italy. It would be tedious and unprofitable to dwell minutely on the extension of vaccination over the whole world; but a few of the incidents connected with it are too remarkable to be omitted. Perhaps the most striking is the expedition which was sent out by the court of Spain in 1803, for the purpose of diffusing cowpox through all the Spanish possessions in the Old and New Worlds, and which returned in three years, having circumnavigated the globe, and succeeded beyond its utmost expectations. The truth is that we who live in that security from the horrible and universal plague of smallpox for which we are indebted to Jenner's immortal discovery cannot realize the greatness of the blessing he conferred upon mankind. The universal enthusiasm caused vaccination to spread over the whole world in the marvelously short period of six years, it being accepted with equal readiness by nations of the most diverse climes, habits, and religions. About the close of the year 1801 Jenner's friends in his native county of Gloucester presented him with a small service of plate as a testimonial of the esteem in which they held his discovery. This was intended merely as a preliminary to the presenting of a petition to Parliament for a grant. He was advised to apply for this, partly to obtain the formal approval of the highest court in the country for vaccination, but also for personal reasons. The premier, Mr. Addington, approved fully of this step, and fixed March 17, 1802, for the presentation of his petition. This was referred to a committee, of which Admiral Berkeley, one of his warmest friends, was chairman, which examined carefully into the utility of vaccination, and Jenner's claims to its discovery. The investigations of this committee resulted in a report in favor of the grant, and ultimately in a vote of £10,000.

Toward the end of 1802 steps were taken to form a society for the proper spread of vaccination in London, and the "Royal Jennerian Society" was finally established, Jenner returning to town (having retired to Berkeley for three months) to preside at the first meeting. This institution began very prosperously, more than 12,000 persons having been inoculated in the first eighteen months, and with such effect that the deaths from smallpox, which for the latter half of the last century had averaged 2,018 annually, fell, in 1804, to 622. Uufortunately the chief resident inoculator soon set himself up as an authority opposed to Doctor Jenner, and this led to such dissensions as caused the society to die out in 1808.

Jenner was led, by the language of the chancellor of the exchequer, when his grant was proposed, to attempt practice in London, but after a year's trial he returned to Berkeley. His grant was not paid until 1804, and then, after the deduction of about £1,000 for fees, it did little more than pay the expenses attendant upon his discovery. Meanwhile honors began to shower upon him from abroad; he was elected a member of almost all the chief scientific societies on the Continent, the first being that of Göttingen, where he was proposed by the illustrious Blumenbach. But perhaps the most flattering proof of his influence was derived from France. He endeavored on several occasions to obtain the release of some of the unfortunate Englishmen who had been detained in France on the sudden termination of the peace of Amiens, but without success, until, in the case of two persons (Doctor Williams, a Ratcliffe traveling fellow, and a Mr. Williams), he applied to the emperor Napoleon himself. It was on this or some such occasion (for he afterward repeated his intercession) that Napoleon was about to reject the petition, when Josephine uttered the name of Jenner. The emperor paused and exclaimed—"Ah, we can refuse nothing to that name."

In 1813 the university of Oxford conferred on Jenner the degree of M.D. It was believed that this would lead to his election into the college of physicians, but that learned body decided that he could not be admitted until he had undergone an examination in classics. This Jenner at once refused; to brush up his classics would, he said, "be irksome beyond measure. I would not do it for a diadem. That indeed would be a bauble. I would not do it for John Hunter's museum."

He visited London for the last time in 1814, when he was presented to the allied sovereigns, and to most of the principal personages that accompanied them. He found sufficient occupation for the remainder of his life in collecting further evidence on some points connected with his great discovery, and in his engagements as a physician, a naturalist, and a magistrate. In 1818 a severe epidemic of smallpox prevailed, and fresh doubts were thrown on the efficacy of vaccination, in part, apparently, owing to the bad quality of the vaccine lymph employed. This caused Jenner much annoyance, which was relieved by an able defense of the practice, written by Sir Gilbert Blane. But this led him, in 1821, to send a circular letter to most of the medical men in the kingdom inquiring into the effect of other skin diseases in modifying the progress of cowpox. A year later he published his last work, and in 1823 he presented his last paper to the Royal Society. He died January 26, 1823.

JENYNS, Soame, was born in London in 1704; studied at St. John's College, Cambridge; sat in parliament for Cambridgeshire, Dunwich, and Cambridge town; was a commissioner to the Board of Trade, and died in December, 1787. As he was rich he easily acquired a literary reputation, but he lacked capacity for the high metaphysical problems that he attacked, and his books are long since securely forgotten. Indeed, his name only survives from the accident that Dr. Johnson criticised in the *Literary Magazine*, his *Free Inquiry into the Nature and Origin of Evil* (1756).

JEPHTHAH, one of the "judges" of Israel, was an illegitimate son of "Gilead," and, being expelled from his father's house by his lawful brethren, took refuge in the Syrian land of Tob, where he gathered around him a powerful band of homeless men like himself. The Ammonites pressing hard on his countrymen, the "elders of Gilead" called for his help, which he consented to give on condition that in the event of victory the supremacy should be conferred upon him. The success of his arms was complete, and he became in consequence "judge" of Israel until his death six years afterward. His name is best known in history and literature in connection with his "vow," which led to the sacrifice of his daughter as a burnt offering on his return from the war. Much reluctance has been, and continues to be, shown by many writers in accepting the plain sense of the Scripture narrative on this point—reluctance which proceeds to a large extent on unwarranted assumptions as to the stage of ethical development which had been reached in Israel in the period of the judges, or at the time when the narrative took shape.

JERBOA, a family of rodent mammals (*Dipodidæ*), chiefly characterized by the great length of the hind limbs as compared with those in front, the disproportion being, in most cases, greater even than in the kangaroos. Like the latter, the jerboas, or jumping mice, as they are also called, raise themselves when disturbed on their hind legs, and execute enormous leaps by the aid of a long muscular tail. When undisturbed, however, they make use of all their limbs in walking, while the front pair are also employed by many species as hands for the conveyance of food to the mouth. The jerboas, of which there are three genera and twenty-two species known, occur chiefly throughout northern and central Africa, southeastern Europe, and central and southern Asia, while one genus (*Pedetes*) is confined to South Africa and another (*Jaculus*) to North America. Of the third genus (*Dipus*) there are twenty known species, a typical example of which is the Egyptian jerboa (*Dipus ægyptius*). The length of its body is eight inches, and of its tail, which is long, cylindrical, and covered with short hair, terminated by a tuft, ten inches. Its front limbs are pentadactylous, and only one inch in length, the hind pair three-toed and six times as long. When about to spring, it raises its body by means of the hinder extremities, and supports itself at the same time upon its tail, while the fore feet are so closely pressed to the breast as to be scarcely visible. Hence probably the name *Dipus*, or two-footed. It then leaps into the air and alights upon its four feet, but, instantaneously erecting itself, it makes another spring, and so on in such rapid succession as to appear as if rather flying than running. It is a gregarious animal, living in considerable colonies in burrows, which it excavates with its nails and teeth in the sandy soil of Egypt

JERDAN, William, an active journalist, born at Kelso in 1782. He removed to London in 1804, reported for the short lived *Aurora* and the *Pilot* evening newspaper, next joined the staff of the *Morning Post*, and subsequently reported during three sessions for the *British Press*, contributing at the same time to the *Satirist, or Monthly Meteor*, the copyright of which he purchased. It was he who seized Bellingham after he had murdered Spencer Percival in the lobby of the House of Commons on May 11, 1812. In 1813 Jerdan became editor of the *Sun*, but sold his share in 1817 to found the *Literary Gazette*, which he edited for thirty-three years. He lent his support to establish the Royal Society of Literature and the Melodists' Club, and in 1830 commenced the *Foreign Literary Gazette*, which died, however, in its thirteenth number. In 1852 Jerdan was granted a pension of £100, while a testimonial was presented to him subscribed to by many of the first men of the day. He published his *Autobiography* in 4 volumes in 1852–53, and in 1866 *Men I Have Known*. He died in London, in 1869.

JEREMIAH. The narrative portions of the Book of Jeremiah are singularly full and precise, and even apart from these the subjective, lyric tone of the prophet's mind enables us to form a more distinct idea of his character than we have of any other prophetic writer. He was the son of a priest named Hilkiah, and it has been held by many, both in ancient and in modern times, that this Hilkiah was the celebrated high priest of that name, who "found the book of the law (Torah) in the house of Jehovah." The battle of Megiddo, which cost Josiah his life, and that of Carchemish, which determined the Babylonian predominance to the west of the Euphrates, were the heralds of a fatal turn in the fortunes of the kingdom of Judah. Jeremiah (the Phocion of Judæa) saw this, and at once foretold the vast extension of Nebuchadnezzar's power. It was during the reign of Jehoiakim that he went through that baptism of complicated suffering which has made him, in a very high and true sense, a type of One greater than he. King and people, priests and (official) prophets, were all against him, or at least the number of his supporters was too small to counterbalance the opposition. Only on one occasion, when accused of a capital crime, as having "prophesied against this city," the "princes," supported by "certain of the elders" and "the people," were successful in quashing the accusation and setting the prophet free. At a later time Jeremiah incurred a still greater danger, though he was providentially saved from the hands of his persecutors. In the fourth year of Jehoiakim (which, it is important to remember, was the first of Nebuchadnezzar) Jeremiah was commanded to write down "all the words that I have spoken unto thee against Israel and against Judah, and against all the nations, * * * from the days of Josiah even unto this day." The interpretation of this passage, clear as it seems at first sight, is by no means easy. Jehoiakim was enraged at the contents of the prophetic roll, cut it in pieces, and threw them into the fire. This time Jeremiah escaped; but under the weak-minded Zedekiah he was more than once imprisoned. It is remarkable that, in the tension of feeling, the "princes," who were formerly friendly to Jeremiah, now took up an attitude of decided hostility to him. At last they had him consigned to a miry dungeon, and it was the king who interfered for his relief, though he remained a prisoner till the fall of Jerusalem. Nebuchadnezzar, who had doubtless heard of Jeremiah's constant recommendations of submission, gave him the choice either of going to Babylon or of remaining in the country. He chose the latter, and resided with Gedaliah, the native governor, at Mizpah. On the murder of Gedaliah, he was carried to Egypt against his will, where he predicted the approaching conquest and desolation of the Nile valley. A legendary tradition states that he suffered death by stoning.

JEREZ DE LA FRONTERA, a city in the province of Cadiz, Spain, near the right bank of the Guadalete, sixteen miles north-northeast of Cadiz (twenty-eight by rail), and sixty-seven south-southeast of Seville. It is pleasantly situated on an undulating plain of much fertility, and covers a considerable extent of ground. The staple article of trade is the wine grown in the neighborhood, known from the name of the town as "sherris" (xeres) or sherry. The population (1898) was 60,004.

JEREZ DE LOS CABALLEROS, a city in the province of Badajoz, Spain, is picturesquely situated thirty-nine miles to the south of that city, on two heights near the Ardila, a tributary of the Guadiana. Population about 10,000.

JERICHO ("fragrant," or, perhaps, according to an old interpretation, "city of the moon") was the first city west of the Jordan occupied by the Israelites. The city was destroyed, and, though it is mentioned from time to time under its usual name or by its epithet "city of palm-trees," it was not rebuilt as a fortified place till the reign of Ahab, when it became the seat of a prophetical society, and appears in the history of the prophet Elisha. The narrative of the healing of the waters by Elisha is referred by Josephus to the copious fountain now called the Sultan's Spring, which lies on the western margin of the Jordan valley, 700 feet below the Mediterranean level, and just under the cliffs of M. Quarantania. The mounds surrounding the spring are of sun-dried brick, and show no traces of ancient building. The position of the town, in a district of great fertility, with rose gardens, various species of date palms, and valuable cultivation of henna, opobalsamum, and myrobalan, secured its prosperity, while its situation at the gate of the great pass leading up from the Jordan valley to Jerusalem gave it strategical importance. According to Eusebius Jericho was destroyed at the time of the fall of Jerusalem, and a new town sprang up, from which he distinguishes the ruins of two earlier cities as still visible.

JEROME, St. (Hieronymus, in full Eusebius Sophronius Hieronymus), was born at Strido (modern Strigau?), a town on the border of Dalmatia fronting Pannonia, destroyed by the Goths in 377 A.D. Some authorities, following Prosper's chronicle, give 330 or 331 as the date of his birth, but from certain passages in his writings it is more probable that he was not born till 340 or 342. What is known of Jerome has mostly been recovered from his own writings, for he was a gossiping sort of man, and biographers have only to string together extracts from his epistles and prologues to get a very good account of his life. His parents were Christians, orthodox though living among people mostly Arians and wealthy. Pope Liberius baptized him in 360; three years later the news of the death of the emperor Julian the Apostate came to Rome, and Christians felt relieved from a great dread.

When his student days were over Jerome returned to Strido, but did not stay there long. His character was formed. He was a scholar, with a scholar's tastes and cravings for knowledge, easily excited, bent on scholarly discoveries. From Strido he went to Aquileia, where he formed some friendships among the monks of the large monastery there, the most notable being his acquaintance with Rufinus, with whom he was destined to quarrel bitterly over the question of Origen's orthodoxy and worth as a commentator; for Jerome was a man who always sacrificed a friend to an opinion, and when he changed sides in a controversy expected his acquaintances to follow him. From Aquileia he went to Gaul, visiting in turn the principal places in that country, from Narbonne and Toulouse, in the south, to Treves, on the northeast frontier. He stayed some time at Treves studying and observing, and it was there that he first began to think seriously upon divine things. From Treves he returned to Strido, and from Strido to Aquileia. He settled down to literary work in Aquileia, and composed there his first original tract, *De Muliere septies percussa*, in the form of a letter to his friend Innocentius. He discovered and copied manuscripts, and began to study Hebrew. He also wrote the life of St. Paul of Thebes, probably an imaginary tale embodying the facts of the monkish life around him. Just then the Meletian schism, which had to do with the relation of the orthodox to Arian bishops and to those baptized by Arians, distressed the church at Antioch, and Jerome, as usual, eagerly joined the fray. Here as elsewhere he had but one rule to guide him in matters of doctrine and discipline—the practice of Rome and the West; for it is singular to see how Jerome, who is daringly original in points of scholarly criticism, was simply a ruthless partisan in all other matters; and, having discovered what was the Western practice, he set tongue and pen to work with his usual bitterness. From Antioch he went to Constantinople, where he met with the great eastern scholar and theologian Gregory of Nazianzus, and with his aid tried to perfect himself in Greek. The result of his studies there was the translation of the *Chronicon* of Eusebius, with a continuation of twenty-eight homilies of Origen on Jeremiah and Ezekiel, and of nine homilies of Origen on the Visions of Isaiah.

In 381 Meletius died, and Pope Damasus interfered in the dispute at Antioch, hoping to end it. Jerome was called to Rome in 382 to give help in the matter, and was made secretary during the investigation. His work brought him into intercourse with this great pontiff, who soon saw what he could best do, and how his vast scholarship might be made of use to the church. Damasus suggested to him to revise the existing Latin translation of the Bible; and to this task he henceforth devoted his great abilities (see BIBLE). At Rome were published the Gospels (with a dedication to Pope Damasus, an explanatory introduction, and the canons of Eusebius), the rest of the New Testament, and the version of the Psalms from the LXX. text, known as the *Psalterium Romanum*, which was followed in 385 by the *Psalt. Gallicanum*, based on the Hexaplar Greek text. These scholarly labors, however, did not take up his whole time, and it was almost impossible for Jerome to be long anywhere without getting into a dispute. He was a zealous defender of that monastic life which was beginning to take such a large place in the church of the fourth century, and he found enthusiastic disciples among the Roman ladies. A number of widows and maidens met together in the house of Marcella to study the Scriptures with him; he taught them Hebrew, and preached the virtues of the celibate life. His arguments and exhortations may be gathered from many of his epistles and from his tract *Adversus Helvidium*, in which he defends the perpetual virginity of the Virgin Mary against Helvidius, who maintained that Mary bore children to Joseph. His influence over these ladies alarmed their relations, and excited the suspicions of the regular priesthood and of the populace, but while Pope Damasus lived Jerome remained secure. Damasus died, however, in 384, and was succeeded by Siricius, who did not show much friendship for Jerome. He found it expedient to leave Rome and set out for the East in 385. Accompanied by two Roman ladies, Jerome made the tour of Palestine, carefully noting with a scholar's keenness the various places mentioned in Holy Scripture. The results of this journey may be traced in his translation with emendations of the book of Eusebius on the situation and names of Hebrew places, written probably three years afterward, when he had settled down at Bethlehem. From Palestine Jerome and his companions went to Egypt, remaining some time in Alexandria; and they visited the convents in the Nitrian desert. Jerome's mind was evidently full of anxiety about his translation of the Old Testament, for we find him in his letters recording the conversations he had with learned men about disputed readings and doubtful renderings. In a monastery at Bethlehem Jerome did most of his literary work, and, throwing aside his unfinished plan of a translation from Origen's Hexaplar text, translated the Old Testament directly from the Hebrew, with the aid of Jewish scholars. He mentions a rabbi from Lydda, a rabbi from Tiberias, and above all Rabbi Ben Anina, who came to him by night secretly for fear of the Jews. Jerome was not familiar enough with Hebrew to be able to dispense with such assistance, and he makes the synagogue responsible for the accuracy of his version. The result of all this labor was the Latin translation of the Scriptures which, in spite of much opposition from the more conservative party in the church, afterward became the Vulgate or authorized version; but the Vulgate as we have it now is not exactly Jerome's Vulgate, for it suffered a good deal from changes made under the influence of the older translations; the text became very corrupt during the Middle Ages, and in particular all the Apocrypha, except Tobit and Judith, which Jerome translated from the Chaldee, were added from the older versions.

Jerome engaged in the Pelagian controversy with more than even his usual bitterness; and it is said that the violence of his invective so provoked his opponents that an armed mob attacked the monastery, and that Jerome was forced to flee and to remain in concealment for nearly two years. He returned to Bethlehem in 418, and after a lingering illness died on September 30, 420.

JEROME OF PRAGUE, the friend and disciple of JOHN HUSS (*q.v.*), derives the surname by which he is best known from his native town, where he was born somewhere between 1360 and 1370. His family name is sometimes, but erroneously, said to have been Faulfisch. After completing his studies in the university of Prague, he proceeded (about 1396) to Oxford, where, in course of a residence of some duration, he became acquainted with the teaching and writings of Wycliffe, of which he became a zealous disseminator on his return to his native land. In 1398 he took his bachelor's degree at Prague, and then visited Paris, Heidelberg, and Cologne; at the first-mentioned university he seems to have graduated as master of arts. Returning about 1407 to Prague, he took a prominent part with Huss in the university disputes which led to the withdrawal of the German "nation." So great did his reputation for learning, energy and sagacity become that he was employed by Ladislaus II., king of Poland, in 1410, to assist in placing the university of Cracow upon a proper footing, while by Sigismund, king of Hungary, he was, although not in orders, invited to preach before him at Ofen. His public discourses in Hungary, however, soon brought him under suspicion of Wycliffite heresy, and he found it necessary to fly the country; taking refuge in Vienna, he was there arrested and thrown into prison, but on the intervention of his friends in Prague obtained his release. He now again became closely associated with Huss in his native city, to which he had once more returned, and where he remained after the expulsion of his friend. In 1415 he went spontaneously to Constance, determined to do what he could for Huss, who had meanwhile been imprisoned there; the news he received on his arrival was so discouraging, however, that, panic-striken, he immediately again withdrew. Though without a safe conduct he would no doubt have reached Prague in safety had he only been able to hold his peace; but while resting at Hirschau he allowed his feelings to gain the mastery of him, and, in the presence of many clergy, he broke out in vehement denunciation of the injustice of the council; the consequence was that he was forthwith arrested by order of the duke of Bavaria and sent back a prisoner to Constance (May, 1415). There, after enduring the most rigorous confinement for some months, he was brought before a public session of the council on September 23, 1415, when he made a full retractation of all errors against the Catholic faith, especially those of Wycliffe and Huss. His enemies, however, were determined that not even thus should he escape their hands; by Michael de Causis and Stephen Palecz (who also had made themselves conspicuous in the persecution of Huss) it was declared that the recantation was ambiguous, and new articles were exhibited against their victim. Thrice again he was brought before a general congregation of the council. On the last of these occasions (May 26, 1416) all his timidity seems to have finally left him. In a bold and vigorous declamation he solemnly retracted the retractation which had been wrung from him eight months before. Four days afterward he was condemned as a relapsed heretic; his reply was an appeal to the supreme Judge before whom he and his accusers alike were destined to stand. Two days later he marched with a cheerful countenance to the stake, bidding the executioner to light the fire before his face; "had I the least fear, I should not be standing in this place." His ashes, like those of Huss, were gathered and thrown into the Rhine.

JERROLD, Douglas William, dramatist, satirist, and one of the most brilliant of the English wits who distinguished the first half of the nineteenth century, was born in London, January 3, 1803. His father, Samuel Jerrold, actor, was at that time lessee of the little theater of Wilsby near Cranbrook in Kent, but in 1807 he removed to Sheerness. From December, 1813, till October, 1815, Douglas Jerrold served his country as a midshipman. He saw nothing of the war save a cargo of maimed warriors from Waterloo; but till his dying day there lingered traces of his early passion for salt water. The peace of 1815 ruined poor Samuel Jerrold; there was no more prize money. On January 1, 1816, he removed with his family to London, where the plucky little ex-midshipman began the world again as a printer's apprentice, studying hard in the gray of the early morning at Latin, pinching himself to get the *Waverly Novels* from the library, and finding unspeakable delight in the pages of his *Shakespeare.* In 1819 Douglas Jerrold was a compositor in the printing-office of the *Sunday Monitor.* Several short papers and copies of verses by him had already appeared in the sixpenny magazines, but he aspired now to contribute to the *Monitor;* and stealthily one evening he dropped into the editor's box a critique of the opera *Der Freischütz.* Next morning he received his own copy to set up, together with a flattering note from the editor, requesting further contributions from the anonymous author. Thenceforward Jerrold was engaged in journalism.

He soon entered another field, where he was to reap no less honorable laurels. In 1821 he had the satisfaction of seeing a comedy that he had composed in his fifteenth year brought out at Sadler's Wells Theater under the title, *More Frightened than Hurt.* Other pieces followed, and in 1825 the popular young dramatist was engaged for a few pounds weekly to produce dramas and farces to the order of Mr. Davidge, of the Coburg Theater. By his marriage, in the autumn of 1824, the "little Shakespeare in a camlet cloak," as he was called, had found a less fitful incentive to industry than his mere ambition; and, while he was engaged with the drama at night, he was steadily pushing his way as a journalist by his daily labors. For a short while he was part proprietor of a small Sunday newspaper. In 1829, through a fortunate quarrel with the exacting Davidge, Jerrold left the "Coburg," and *Black-Eyed Susan* was brought out on the "Surrey" boards. The success of the piece was enormous. With its free gallant sea-flavor, it took the town by storm, and "all London went over the water to see it." On the three hundredth night the theater was illuminated. Elliston, manager of the "Surrey," made thousands of pounds; T. P. Cooke, who played William, made his reputation; Jerrold received about £70 ($350). But his fame as a dramatist was achieved. In 1830 it was proposed that he should adapt something from the French for Drury Lane. "No," was his reply to the offer, "I shall come into this theater as an original dramatist or not at all." In December of the following year he was received on his own terms; *The Bride of Ludgate* was the first of a number of plays which found their way to Drury Lane stage. The other patent houses threw their doors open to him also (the Adelphi had already done so); and, in 1836, Jerrold himself became co-manager of the Strand Theater with Mr. Hammond, his brother-in-law. The venture was not successful, and the partnership was dissolved. While it lasted Jerrold wrote his only tragedy, *The Painter of Ghent*, and appeared himself in the title rôle, without any very marked success. His pen continued to be fruitful of sparkling comedies till 1854, when his last piece, *The Heart of Gold*, was written.

Meanwhile he had won his way to the pages of numerous periodicals—before 1830 of the second-rate magazines only, but after that to those of more importance; and he had almost reached comfort and ease when an obligation, undertaken for an unfortunate friend, drove him forth to fresh years of hard toil. When at last he could settle in comfort, he found himself the center of a host of friends, whose affection was his no less than their admiration; and his last years were spent in peaceful happiness. The *Monthly Magazine*, *Blackwood's*, the *New Monthly* and the *Athenæum* all welcomed his brilliant articles. To *Punch*, the publication which is associated with his name, he contributed from its second number, in 1841, till within a few days of his death. He founded and edited for some time, though with indifferent success, the *Illuminated Magazine*, *Jerrold's Shilling Magazine* and *Douglas Jerrold's Weekly Newspaper*, and, under his editorship, *Lloyd's Weekly Newspaper* rose from almost nonentity to a circulation of 182,000. The history of his later years is little more than a catalogue of his literary productions, interrupted now and again by brief flights to the Continent or to the country. Douglas Jerrold died at his house, Kilburn Priory, in London, on June 8, 1857.

JERSEY, the largest and most important of the Channel Islands (*q.v.*), is situated sixteen miles west of Normandy and 125 south of Southampton. The total area comprises 28,717 imperial acres, or about forty-five square miles. It is of oblong form, with a length of about eleven miles from east to west, and an average breadth of about five and one-half miles. The surface of the country is broken by winding valleys having a general direction from north to south, and as they approach the south uniting so as to form small plains. The lofty hedges which bound the small inclosures into which Jersey is divided, the trees and shrubbery which line the roads and cluster round the uplands and in almost every nook of the valleys unutilized for pasturage or tillage, give the island a rich and luxuriant appearance, and completely neutralize the bare effect of the few sandy plains and sand-covered hills. Some of the coast scenery is grand and striking, presenting many features of special interest.

The island enjoys a very early spring and a lengthened autumn. Snow and frost are rare, but dense fogs frequently prevail. Fruits and flowers indigenous to warm climates grow freely in the open air. The land is rich and very productive, the soil being chiefly a deep loam, which is lighter upon syenite and granite than upon the other formations; the sandy portions in the vicinity of the bays have become very fruitful through cultivation. The lands are held either as freeholds or on a nine years' lease. On account of the Norman law of succession the farms have become very much subdivided. It is only rarely that they exceed fifty acres, and very many are less than three acres. The farmhouses and cottages are remarkably neat and comfortable; and the peasantry, who all farm their own land, are perhaps the most contented and prosperous in the United Kingdom.

The mainstay of Jersey is cattle, which numbered 11,022, or the large average of 58 to every 100 acres under cultivation. The breed is that commonly known as the Alderney, and is kept pure by stringent laws against the importation of foreign animals. The number of cows was 5,884, of other cattle above two years of age only 756, and of cattle below two years of age 4,382. It will thus be seen that cattle are kept chiefly for dairy purposes. The milk is used almost exclusively to manufacture butter. The cattle are always housed in winter, but remain out all night from May till October. Horses numbered 2,261. Originally there was a small black breed of horses peculiar to the island, but now they are chiefly imported from France or England. Pigs form the staple food of the inhabitants, and numbered 5,844. Only a few sheep are kept.

The only town of importance is St. Helier, situated on St. Aubin's Bay. It has rather a mean and uninteresting appearance, but beautiful views are obtained from various points. Although the streets are generally narrow and irregular, they are clean and well paved, and the Royal Square is spacious and airy. The town possesses an outer and an inner harbor. The population of Jersey, in 1901, was 52,706.

JERSEY CITY, the chief city of Hudson county, in the State of New Jersey, is situated on the west bank of the Hudson, opposite New York, to which it stands in a relation similar to that of Birkenhead to Liverpool. It is laid out irregularly, owing to its being an aggregation of three formerly distinct municipalities. Many of the streets are broad and well paved, and the city is provided with efficient gas, water, and sewerage systems. It has few striking buildings, the most prominent structures being the immense grain elevators near the river, three hospitals, an orphans' home, and the public school buildings, twenty-one in number. The public schools are supported by State and city taxes, and administered by a board of education. The trade of the city is very considerable; but, as it is embraced in the New York customs district, separate returns are not made. The fact that it is a terminus for three lines of ocean steamers, five trunk-lines of railways, seven lesser railways, and the Morris canal, greatly facilitates the transport of coal, iron, etc., and materially fosters its industries. Jersey City has iron foundries, iron, steel, and zinc works, boiler yards, machine shops, railway plant manufactories, tobacco factories, breweries, and other establishments which turn out watches, glass, crucibles, sugar, soap, candles, and a large variety of hardware and other articles. The civic receipts, for the year 1901, amounted to $4,201,069. The amount of the bonded debt (1902) was $9,208,400, and of the water debt $5,136,000. The "City of Jersey" was incorporated in 1829; but in 1851 it received another charter under its present name. The population, in 1900, was 206,433.

JERUSALEM (Heb. *Yerushalayim*, pronounced as a dual; but the old pronunciation seems to have been *Yerushalem*, whence, through the LXX., we have the common English form). The meaning of the name is obscure, none of the current interpretations, "vision of peace," "abode of peace," and the like, being free from difficulty.

The history of Jerusalem exploration dates from the year 1833, when Bonomi, Catherwood, and Arundale succeeded in obtaining admission into the Haram (Harám) inclosure and made the first survey of its buildings. In 1838 and 1852 the city was visited by the famous American traveler, Doctor Robinson, and his bold impeachment of the traditional topography, while raising a storm of controversy, laid the foundation of a truer understanding of the antiquities of Jerusalem.

The city stands at the extremity of a plateau which shelves down in a southeast direction from the watershed ridge of Judæa, which is here somewhat contorted. About a mile north of the town the ridge coming from the north is deflected toward the west at an elevation averaging 2,600 feet above the Mediterranean, and thus passes clear of the city on its west side. From this ridge at the point of deflection an important spur with steep and rugged eastern slopes runs out southeast for one and one-half miles, and thence southward for one and one-quarter miles more. The spur culminates in two principal summits, the most northerly 2,725 feet above the sea, the second (now crowned with a village and a minaret) 2,650 feet above the same level; and there is a third summit or knoll on the south terminating the spur and rising to an elevation of 2,410 feet. To this chain (but more especially to the central summit with the minaret on it, now called *Jebel et Tôr*) the name Olivet applies. The plateau between this chain and the watershed ridge is drained by two flat open valley heads which form a junction about one-half mile north of the northeast angle of the modern city, and become a deep ravine with sides steep and in places precipitous, running immediately beneath and west of Olivet for a distance of one and one-half miles from the junction to a well called *Bîr Eyûb*, where the bed is 1,979 feet above the Mediterranean and 430 feet below the termination of the Olivet chain. This valley is the "brook" Kidron, bounding the site of Jerusalem on the east. A second valley has its head in a shallow depression northwest of the city close to the watershed, whence it first runs south for about one-half mile, and then—rapidly deepening and flanked by low precipices—trends east for another half mile, joining the Kidron in an open plot close to the Bîr Eyûb above noticed. The second valley thus flanking Jerusalem on the west and south incloses an area half a mile wide and rudely quadrangular—the seat of the city itself whether ancient or modern.

The site thus generally described—a natural fortress standing on spurs of hill surrounded on three sides by valleys 300 to 400 feet deep—is but imperfectly supplied with water. Only one spring exists anywhere near the city, namely, that in the Kidron valley, about 700 yards above the junction with the western ravine, now called the "spring with steps" or the "Virgin's spring."

The actual position of the city at various times has differed but little in comparison with other capitals. The outline of the small spurs concerning which so many famous controversies have arisen is now much obscured by the accumulation of rubbish, which has been increasing ever since the time of Nehemiah. There is an average depth of from thirty to forty feet of this débris through the town, and the foundations of the modern houses often stand upon it. In the valleys there is a depth of seventy feet, and east of the temple in one place shafts were sunk 120 feet before the rock was reached. The natural features of the ground, although unaltered and traceable to a practiced eye, are thus less sharply accentuated than in the ancient period of the city's history. As, however, we have now more than 250 actual observations of the rock levels in an area of 210 acres, there is no difficulty in recovering the general features of the ancient natural site of the town.

The identity of the present Harám (or sanctuary) with the ancient temple inclosure is undisputed, the only question which has arisen being whether the boundary walls now existing coincide with the outer ramparts of Herod's temple inclosure. The Harám is a quadrangle containing thirty-five acres, the interior surface roughly leveled partly by filling up with earth the portions where the rock is lowest, partly by means of vaulted substructures of various ages. The most important results of Captain Warren's excavations were those connected with the exploration of the rampart walls, which measure 1,601 feet on the west, 922 on the south, 1,530 on the east, and 1,042 on the north, the southwest angle being 90°, and the southeast 92° 30′. The height of the wall varies from 30 to 170 feet. On the west, on the south and on the east, for probably 1,090 feet from the southeast corner, the masonry is all of one style, the stones being of great size with a marginal draft—the imperfect finish of the faces in some of the lower courses apparently showing that the foundation stones were never visible above the surface. The north part of the east wall consists, however, of masonry differing somewhat from the rest, the finish being rougher and the stone of inferior quality. It was found that this wall is continued for some distance beyond the northeast corner of the present area. The present north wall is of quite a different kind of masonry, and appears to be much more recent, the substructures immediately inside being only as old as the twelfth century. The northwest angle is formed by a projecting scarped block of rock measuring 350 feet east and west and 50 feet north and south, the height above the interior court being about 30 feet. On this scarp the modern barracks stand, and a fosse 60 feet deep and 165 feet wide is still traceable outside the rock on the north. A valley bed 100 feet below the level of the Harám court ran across the northeast portion of the area into the Kidron; and south of this the remains of a scarp running east and west have been discovered, but are not as yet completely explored. The prolongation of this scarp eastward cuts the east wall of the Harám at a point 1,090 feet from the south angle, at which the change in the character of the masonry above explained probably occurs. The evidence thus obtained seems to indicate that an area of about 7½ acres has been added to the ancient inclosure on the northeast to give it the present quadrangular form, and the rougher masonry on the east appears to have belonged to the city wall constructed by Agrippa, and not to the older wall of Herod's temple.

Up to the time of David the strong fortress of Jerusalem remained in the hands of the ancient Canaanite inhabitants, who were known as Jebusites.

The city was deemed impregnable, but its conquest was one of the first exploits of David, when he became king of all Israel, and had need of a capital that should serve as a base for his military operations and a center of union for Judah and Israel. Lying on the frontier line between his own tribe of Judah and the difficult country of Benjamin, which had been the center of the struggle with the Philistines since the fall of Shiloh, Jerusalem was admirably adapted for these purposes. The Jebusites were not expelled, but continued to live side by side with the Hebrews. David himself occupied "the mountain fortress of Zion," which was strengthened by new walls and received the name of the city of David. Here a palace was built by Tyrian architects, and the new capital was consecrated by the removal to it of the ark.

The site of the city of David forms the fundamental question of Jerusalem topography. It is necessary at the outset to clear away the popular idea that the capital of David was already a great town, occupying a site comparable in extent with that of the later city. Zion was merely one of the "mountain fortresses" found all over Palestine as places of refuge in time of invasion, and was garrisoned by a handful of mercenaries (the *Gibbôrîm*). The whole levy of Israel in David's time was but 30,000 men, and before the development of trade among the Hebrews Jerusalem had not the natural conditions for the growth of a great city. In the first instance the town doubtless consisted mainly of the court and its dependents, with the Jebusite population, who must have been predominantly agricultural, and limited in number by the limitation of their territory. Now it is quite incredible that the Temple hill was ever excluded from Zion. Throughout the Old Testament Zion appears as the holy mountain, the seat of the sanctuary. It is true at the same time that Zion and the site of Jerusalem are interchangeable ideas in Hebrew literature; but this only proves that the mountain of the sanctuary was essentially the mountain on which the city stood. Further, it is clear from 1 Kings viii. 1 *sq.*, 2 Sam. xxiv. 18, that the temple stood above the city of David, as elsewhere in Hebrew holy places the sanctuary crowned the hill on whose slopes the town stood. Moreover, the graves of the kings, which were certainly in the city of David, encroached on the temple enclosure, which indeed at the time of the captivity was closely built up, and stood in the middle of the city. Again, Micah iv. 8 identifies the ancient "tower of the flock," the original seat of the kingdom at Jerusalem, with "Ophel of the daughter of Zion." But Ophel is one of the few topographical names that can be traced down to the time of Josephus, whose description shows that it lay to the southeast of the temple. Still more precise is the determination given by references to the one fountain of Jerusalem, which springs out under the Temple hill on the east. According to Neh. iii. 15, xii. 37, the city of David was reached by a stair in the vicinity of the fountain gate and the pool of Siloah. This ascent led up above David's palace to the water gate, where in Nehemiah's time there was an open space in front of the temple. Thus we see that David's palace lay between the temple and the pool of Siloah or King's pool.

According to the Bible, then, the city of David lay on the southern part of the hill which his son crowned with the temple. The chief feature in the fortifications was a tower named Millo, perhaps on the site of the modern barracks, protecting the approach to Zion from the north. The town had but little splendor. The king occupied a wooden palace, the work of foreign craftsmen, and the ark still dwelt in curtains. Under Solomon, who had the true Oriental passion for building and luxury, and squandered enormous sums on his court, great improvements were made, especially by the erection of the twin palaces "the house of Jehovah and the house of the king," constructed of stonework strengthened by string courses of wooden beams in the still familiar style of Arabian building. The palace, which took nearly twice as long to erect as the temple, consisted of a great complex of buildings and porticoes, including the porch of judgment, an armory, and the palace of the queen.

The site of the palace has been variously assigned by topographers. But it lay above the old residence of David, and all the indications given in the Old Testament lead us to place it quite close to the temple, with which its porticoes seem to have been connected.

After the division of the kingdoms Jerusalem was shorn of its political glory. The city itself was taken by Shishak in the reign of Rehoboam, and lost the riches accumulated by Solomon. The great houses of Omri and Jehu quite overshadowed the kingdom of Judah, which forgot its weakness in the reign of Amaziah only to receive signal chastisement from Jehoash, who took Jerusalem, and partly leveled the walls. The decline and fall of Samaria raised the relative importance of the southern capital; the writings of the prophets show that wealth had accumulated and luxury increased.

For the compass of the walls of Jerusalem at the time of its capture by Nebuchadnezzar the chief document is the account of the restoration of the fortifications by Nehemiah, who followed the old line, and speaks of the various gates and towers by their old names. His description presents many difficulties, the most intelligible part being that which deals with the eastern wall, from Siloah and the fountain gate to the point where the temple and the palace joined one another. The western boundary of the city is particularly obscure, and its position must be mainly determined by reference to the "valley gate."

The long blank in the history of the Jews which follows the time of Nehemiah makes it impossible to trace the progress of Jerusalem in any detail. Under the Persian empire the Jews enjoyed little prosperity. Alexander spared the city, but in 320 its walls were razed by Ptolemy I. A period of comparative prosperity followed, culminating in the high priesthood of Simon II. (219-199 B.C.), who repaired the temple and strengthened its defenses and fortified the city. The walls were again destroyed, and the city burned by the army of Antiochus Epiphanes in 168 B.C. When Judas Maccabæus reconsecrated the temple (165) he also fortified the holy mountain of Zion (the Temple hill) with wall and towers. Once more razed by the Greeks, the walls of the city were renewed with hewn stone by Jonathan.

Under the Hasmonean dynasty we meet with the first unambiguous evidence that the city had extended to the loftier western hill, where a new palace was erected overlooking the temple. This continued to be the royal quarter, and was raised to great splendor by Herod, who covered a vast extent of ground with his palace, its courts and pleasure grounds. The palace of Herod embraced two edifices transcending the temple in magnificence, and the three enormous adjoining towers, Hippicus, Phasael and Mariamne, made the upper city the strongest part of Jerusalem.

When Pompey besieged the Temple hill in 65 B.C., the bridge was broken down, and the Tyropœon afforded a complete defense on the west. His assault was made from the north, where there was a strong wall with towers and a deep fosse which was with difficulty filled up to permit the advance of his siege train. This fosse must be identified with the rock-cut trench north of the Haram area, and from Josephus' description seems to have been still the northern limit of the town. The walls destroyed by Pompey were restored by Antipater, and ten years later yielded, after an obstinate resistance, to Herod and the Romans, (37 B.C.) The fortress of Antonio, occupied by Antigonus, was not surrendered till the temple and the rest of the city had been carried by storm, and we now read of two walls which had to be reduced successively.

The most important buildings erected by Herod have already been alluded to, and his reconstruction of the temple will be considered under that heading. But the walls of the city as they existed at the time of the siege by Titus were three in number. In the siege under Titus the Romans successively carried the third and second walls. They then occupied Antonia, which was leveled to facilitate the approach of the forces for the attack on the temple stronghold. The temple was opened by fire rather than force, and, the Jewish leaders having retired to the upper city, the lower town from the temple to Siloah was burned by the Romans. The capture of the upper city was effected by a regular approach with mounds and battering rams (September, 70 A.D.), and even then the huge citadel of Herod could only have yielded to famine had it not been abandoned by the Jewish leaders in a vain attempt at escape. Its three great towers, with a portion of the western wall, were left as a memorial, and of this group the so-called tower of David (Phasael) still stands.

The rebuilding of Jerusalem by Hadrian seems to have been originally conceived in a spirit friendly to the Jews, and there is even some evidence that the restoration of the temple was contemplated or commenced. After the great revolt, however, Ælia Capitolina was transformed into a purely pagan town with seven quarters and many buildings of heathen fashion. The spread of Christianity and the rise of the practice of pilgrimage gave a new importance to the city of the crucifixion and resurrection, and in the time of Constantine the discovery of the Holy Sepulcher and the erection of the magnificent church of the Anastasis (dedicated 336 A.D.) again made Jerusalem a great religious center. In the pagan reaction under Julian an attempt was made to rebuild the temple, but was frustrated by an outburst of fire from the foundations (362). The unfortunate empress Eudocia spent her last years at Jerusalem (*c.* 350-360), repaired the walls, built the church of St. Stephen, founded monasteries and hospitals, and enriched the churches. The next great builder was Justinian, part of whose splendid church of St. Mary perhaps still remains in or to the east of the mosque El-Aksa. In 614 Jerusalem was taken by Chosroes, and the churches and sepulcher were burned, but the patriarch Modestus restored them as soon as the Persians retired. In 637 Jerusalem capitulated to the caliph Omar, who gave directions for the erection of a place of worship on the site of the "remotest shrine," *i.e.*, the temple, to which Mahomet, according to Kor. xvii. 1, was transported from Mecca in his famous night journey. From this verse the great sanctuary of Jerusalem received the name El-Aksa, now generally confined to the building at the south end of the Haram. The original mosque as described by Arculphus (670) was a rude edifice of wood capable of containing 3,000 worshipers; but soon after the sanctuary was reconstructed in a style of great magnificence by the caliph 'Abd el Malik, whose date (691 A.D.) is still read on a Cufic inscription on the Dome of the Rock, though the name of the caliph seems to have been changed to that of El-Mamún, who restored the buildings after a great earthquake, which, according to Mokaddasy, left nothing standing except the part around the *mihrâb* or niche indicating the direction of Mecca. In their present condition the buildings of the sanctuary show features of very various styles from the Byzantine downward.

The architectural problems which they suggest are closely connected with controversies as to the topography of the temple and the true site of the Holy Sepulcher, both of which subjects will be more conveniently discussed under Temple. Apart from the question of the holy sites, the later topography of Jerusalem presents no feature that need detain us, and the subsequent fortunes of the city belong to the general history of Palestine and the crusades.

The walls of the modern city inclose an area of 210 acres, the greater part thickly crowded with houses, although on the northeast and south there are plots of ground near the ramparts not occupied by buildings. The houses are of stone, with flat stone roofs, having small domes supported on arches in the middle, and the aspect of the city is specially colorless and stony. The streets are only narrow lanes running at right angles to one another. The principal streets are the same as in the twelfth century, and in many cases retain Arabic names at least four hundred years old. They are arched over here and there, and the bazaars, with portions of the Via Dolorosa and of other streets, are entirely covered in.

Viewed from the Mount of Olives, the most conspicuous object is the Haram inclosure, occupying nearly one-sixth of the city, with the Dome of the Rock rising in the center and the Aksa mosque extending to the southern wall, while between these two buildings are the tall cypresses which surround the fountain *El Kâs*. In the Jewish quarter two large synagogues with domes—one painted green—are conspicuous, while the church and convent of St. James is the special feature of the Armenian quarter. Close to the Jaffa gate rise the square tower of David and a minaret within the citadel, while immediately east of this fortress stands the Protestant English church and the large palace of the Anglo-German Protestant bishop. Northeast of these are seen the two domes of the rotunda and choir of the Holy Sepulcher, and immediately south of them the minaret of Omar's mosque on the site of the great hospital of St. John. The modern Latin cathedral and patriarchate appear behind the Holy Sepulcher church, while the highest ground outside the city on the northwest is occupied by the Russian cathedral, hospice, and consulate, only completed in 1866.

The country around the city is barren and stony. Olive groves exist on the north, and the white slopes of Olivet are dotted with the trees whence it is named. Vineyards also exist on the west, but since the destruction of the fruit-trees by Titus the vicinity of Jerusalem seems always to have presented a sterile appearance.

The number of churches and monasteries in the modern city, without counting many crusading chapels now either in ruins or else converted into mosques, is very large.

Jerusalem under the Turks is the capital of southern Palestine (about 2,000 square miles), and the seat of a *mutasarrif* under the *wâly* of Syria. The *mejlis* or town council consists of eight members—four Moslem, three Christian, one Jewish, the latter being the chief rabbi of the Sephardim. The export trade of the city consists chiefly of oil, corn, sesame, cotton (of poor quality), and soap, also of rosaries, crucifixes, and cameos, carved in olive wood and mother of pearl. The imports include cotton, wool, hardware, timber, silk, and glass from England and Austria; wines and spirits from France; and flour from Russia. Rice is imported in coasting vessels from Egypt; wine, spirits, dried fish, etc., from Cyprus and the Greek islands; carpets and shawls are brought by the Moslem and Christian pilgrims. There are also a few potteries in the city.

The population of Jerusalem, stated in 1838 at about 11,000, has increased rapidly of late years, owing to a great increase in the Jewish population, which has risen in that time from 3,000 to over 10,000 souls. According to a consular estimate, the population was as follows, the total agreeing very closely with an independent estimate by Frère Lievin, the Franciscan:—Jews (Sephardim, 8,600; Ashkenazim, 12,000), 20,600; Moslems, 1,600; Christians, 9,800; total, 42,000.

JESI, a city in the circle and province of Ancona, Italy, is situated on a slight eminence on the left bank of the Esino, seventeen miles west-southwest of Ancona, with which it is connected by rail. The population is 11,500.

JESSE, Edward, a popular writer on natural history, was born at Hutton Cranswick, Yorkshire, January 14, 1780. He died at Brighton March 29, 1868. His books include *Gleanings in Natural History* (1832–35), *An Angler's Rambles* (1836), *Scenes and Tales of Country Life* (1844), *Anecdotes of Dogs* (1846), and *Lectures on Natural History* (1861); besides editions of Walton's *Complete Angler*, White's *Selborne*, and Ritchie's *Windsor Castle*.

JESSE, John Heneage, son of Edward Jesse noticed above, was born in 1808. From his early manhood he held an office in the secretary's department of the Admiralty at Whitehall. His first contribution to literature, a poem on Mary Queen of Scots, which he dedicated to Sir Walter Scott, was published in 1829, and this was followed in 1830 by a collection of poems entitled *Tales of the Dead*. Among his other efforts in verse were a drama (*Richard III.*) and a fragmentary poem entitled *London*, dedicated to Mr. Rogers the poet. He died July 7, 1874.

JESSELMERE. See Jaisalmir.

JESSOR, or Jessore, a British district in the lieutenant-governorship of Bengal, with an area (1878) of 3,658 square miles, forms the eastern portion of the presidency division.

Jessor forms the central portion of the delta between the Hooghly and the united Ganges and Brahmaputra. It is a vast alluvial plain intersected by rivers and watercourses, which at places in the southern portion of the district spread out into large marshes. The northern part of the district is verdant, with extensive groves of date-palms; villages are numerous and large; and the people are prosperous. In the central portion the population is sparse, the only part of the tract suitable for dwellings being the high land on the banks of rivers. Its population is estimated at 2,200,000.

JESUITS. The "Company of Jesus," in its original conception, and in its avowed or ostensible objects, does not at the first glance appear as more than one of many similar communities which have grown up in the bosom of Latin Christianity. Like several of them, it is a congregation of ecclesiastics living in accordance with a definite rule, whence technically called "Clerks Regular;" like the Templars, Hospitalers and Teutonic Knights, military ideas have entered largely into its plans; like Benedictines, Dominicans and Franciscans, its spiritual labors have been those of teaching the young by schools and catechisings, conducting home missions by such agencies as sermons, retreats, and the like, combatting heresy with the pulpit and the pen, and converting the heathen. In each and all of these peculiarities and occupations it comes late into a field where its precursors had been busy for centuries, and it might seem to differ from them merely by a more careful selection of instruments, a more skillful organization and a more perfect discipline.

But such a view is entirely misleading. On closer examination the Jesuit body proves to resemble those other religious societies only in external and separable accidents, differing from them and from all others in its essential character, and that not in degree merely, but in kind also, so as to be an institution absolutely unique in history. In the first place, all the earlier associations of the kind, even the military orders themselves, have their origin in a desire to withdraw so far as possible from contact with the world and its concerns, to seek spiritual perfection in a retired life of contemplation and prayer, to concentrate efforts for this end chiefly within the cloister where each such group is collected, and to act only indirectly, and as it were with the mere surplus overflow of religious energy, on their more immediate neighbors around, and even then chiefly with the idea of persuading all the most devout and fervent among them to forsake the world in a similar fashion. Contrariwise, the Jesuit system is to withdraw religious men from precisely this sort of retirement, except as a mere temporary preparation for later activity, and to make habitual intercourse with society a prime duty, rigidly suppressing all such external regulations of dress, rule, and austerities as tend to put obstacles in the way, so leaving the members of the "Company" free to act as emissaries, agents, or missionaries in the most various places and circumstances. Next, the constitution of the elder societies was for the most part democratic. Allowing for special exceptions, the normal scheme of government was this:—Each house of an order had a separate life and partial independence of its own. It elected its own superior and officers, usually by ballot, for a short term of years, discussed its business, and its members confessed their faults, in open chapter. Each group of houses elected a provincial; the provincials, or delegates from among them, elected the general, whose authority was strictly constitutional, and limited as definitely by the rule and statutes as the rights of the youngest novice. Further, admission was seldom difficult; the novitiate rarely exceeded two years, and the novice, professed at the close of that probation, at once entered on a share in the government of the society, and became eligible for its highest offices. Unlike this method in every respect, the Jesuit polity is almost a pure despotism, guarded, no doubt, with certain checks, but even those of an oligarchical kind. The general is indeed elected by the congregation of the society; but, once appointed, it is for life, and with powers lodged in his hands, partly due to the original constitutions, and partly to special faculties and privileges conferred by various popes, which enormously exceed, as regards enactment and repeal of laws, as to restraint and dispensation, and both in kind and degree, those wielded by the heads of any other communities. He alone nominates to every office in the society (with certain significant exceptions to be named presently) and appoints the superiors of all the houses and colleges. The vow of obedience is taken directly to him, and not, as in the older orders, to the rule, as distinguished from the mere chief of the executive. The admission or dismissal of every member depends upon his absolute fiat; and, by a simple provision for reports to him, he holds in his hands the threads of the entire business of the society in its most minute and distant ramifications.

Once more, the distinguishing peculiarity of the earlier communities, dating from the origin of the Benedictine rule, is their hostility to local change. The vow of *stability*, soon added to the three customary pledges of poverty, chastity, and obedience, was designed to impede, not merely itinerancy without settled abode, such as had brought discredit on those ancient monks who were styled *circumcellions*, nor even easy transition from one religious community to another, unless in search of greater austerity, but even facility of transfer from one house to another of the very same order. Where the profession was made, there, in the absence of exceptional reasons, the life should be spent; and this rule of course tended to nationalism in the monasteries of every country, even in the great military orders, which, though accepting recruits from all quarters, yet grouped them into *tongues*. But mobility and cosmopolitanism are of the very essence of the Jesuit programme. The founder of the society has excluded the possibility of doubt on this subject, for having chosen the military term "Company," rather than "Order" or "Congregation," to describe his new institute, he explained its meaning to Paul III. as being that, whereas the ancient monastic communities were, so to speak, the infantry of the church, whose duty was to stand firmly in one place on the battlefield, the Jesuits, contrariwise, were to be the "light horse," capable of going anywhere at a moment's notice, but especially apt and designed for scouting or skirmishing. And, to carry out this view, it was one of his plans to send foreigners as superiors or officers to the Jesuit houses of each country, requiring of these envoys, however, to use invariably the language of their new place of residence, and to study it both in speaking and writing till entire mastery of it had been acquired—thus by degrees making all the parts of his vast system mutually interchangeable, and so largely increasing the number of persons eligible to fill any given post, without reference to locality.

Further, the object of the older monastic societies was the sanctification of their individual members. In truth, community life was only a later development of the original system, as exhibited in the Thebaid, in accordance with which solitary hermits began to draw near to each other, until the collection of separate huts gradually assumed the form of a *laura* or hamlet of cells, grouped under an abbot, and with a common place of worship—a model still surviving in the Camaldolese order. Their obedience to a superior, and the observance of some kind of fixed rule, had no further intention than the improvement of the spiritual character of each person who entered such a community; and, with certain qualifications, this has continued the ideal of the older orders, modified chiefly by the natural desire of each such body to gain influence and credit from the personal character of all its members and the efficiency of its active operations. But the founder of Jesuitism started at once with a totally different purpose. To him, from the first, the society was everything, and the individual nothing, except so far as he might prove a useful instrument for carrying out the society's objects. In a MS. collection of sayings by Loyola, whose genuineness is accepted by the Bollandists, themselves Jesuits, and by his biographer F. Genelli, he is stated to have said to his secretary, Polanco, that "in those who offered themselves he looked less to purely natural goodness than to firmness of character and ability for business, for he was of opinion that those who were not fit for public business were not adapted to filling offices in the society." He went even further than this, and laid down that even exceptional qualities and endowments in a candidate were valuable in his eyes only on the condition of their being brought into play or held in abeyance strictly at the command of a superior. On this principle, he raised obedience to a position it had never held before, even among monastic virtues. His letter on this subject, addressed to the Jesuits of Coimbra in 1553, is still one of the standard formularies of the society, ranking with those two other products of his pen, the *Spiritual Exercises* and the *Constitutions;* and it is evident that his views differ very seriously from the older theories on the subject, as formulated in other rules. In them the superior is head of a local family, endued with paternal authority, no doubt as understood by the old civil code of the Roman empire, centuries after the very name of freedom had been lost, yet having fixed limits, alike traditional and prescribed, besides being exercised only within a limited area and for certain specified purposes. Loyola, true to his military training and instincts, clothes the general with the powers of a commander-in-chief of an army in time of war, giving him the absolute disposal of all members of the society in every place and for every purpose. Not only so, but he pushes the claim much further, requiring, besides entire outward submission to command, also the complete identification of the inferior's will with that of the superior. He lays down that this superior is to be obeyed simply as such, and as standing in the place of God, without reference to his personal wisdom, piety, or discretion; that any obedience which falls short of making the superior's will one's own in inward affection as well as in palpable effect is lax and imperfect; that going beyond the letter of command, even in things abstractly good and praiseworthy, is disobedience; and that the "sacrifice of the intellect"—a familiar Jesuit watchword—is the third and highest grade of obedience, well pleasing to God, when the inferior not only wills what the superior wills, but thinks what he thinks, submitting his judgment so far as it is possible for the will to influence and lead the judgment. So far-reaching and dangerous are these maxims that the *Letter on Obedience* was formally condemned, not long after Loyola's death, by the Inquisition in Spain and Portugal, and it tasked all the skill and learning of Bellarmine as its apologist, together with the whole influence of the company, to avert the ratification of the sentence at Rome.

It has, however, been alleged in defense that this very strong language must be glossed and limited by two other maxims penned by Loyola: (1) "Preserve your freedom of mind, and do not relinquish it by the authority of any person, or any circumstances whatever;" and (2) "In all things *except sin* I ought to do the will of my superior, and not my own." But the value of these checks is seriously diminished when it is added that the former of them occurs in the introductory part of the *Spiritual Exercises*, a manual expressly designed and used for the purpose of breaking down the will of those who pass through its appointed ordeal under a director; while the latter is qualified in its turn, not only by the whole principle of probabilism, the special doctrine of the society, which can attenuate and even defend any kind of sin, but by the four following maxims, in close juxtaposition to itself in the very same document: "I ought to desire to be ruled by a superior who endeavors to subjugate my judgment or subdue my understanding;" "When it seems to me that I am commanded by my superior to do a thing against which my conscience revolts as sinful, and my superior judges otherwise, it is my duty to yield my doubts to him, unless I am otherwise constrained by evident reasons;" "If submission do not appease my conscience, I must impart my doubts to two or three persons of discretion, and abide by their decision;" "I ought not to be my own, but His who created me, and his, too, by whose means God governs me, yielding myself to be molded in his hands like so much wax. * * * I ought to be like a corpse, which has neither will nor understanding, or like a small crucifix, which is turned about at the will of him that holds it, or like a staff in the hands of an old man, who uses it as may best assist or please him." And one master-stroke of Loyola's policy was to insure the permanence of this submission by barring access to all independent positions on the part of members of the society, through means of a special constitution that no Jesuit can accept a cardinal's hat, a bishopric other than missionary, an abbacy, or any similar dignity, save with permission of the general, not to be accorded unless and until the pope has commanded its acceptance under pain of sin.

The next matter for consideration is the machinery by which the society is constituted and governed, so as to enable this principle to become a living energy, and not a mere abstract theory. The society, then, is distributed into six grades—novices, scholastics, temporal coadjutors, spiritual coadjutors, professed of the three vows, and professed of the four vows. The novice cannot become a postulant for admission to the society till fourteen years old, unless by special dispensation, and is at once classified according as his destination is the priesthood or lay-brotherhood, while a third class of "indifferents" receives such as are reserved for further inquiry before a decision of this kind is made. They first undergo a strict retreat of a month in what is practically solitary confinement, during which they go through the *Spiritual Exercises*, and make a general confession of their whole previous life; after which the first novitiate, of two years' duration, begins. This is spent partly in daily study, partly in hospital work, and partly in teaching the rudiments of religious doctrine to children and the poor. They may leave or be dismissed at any time during this novitiate, but if approved are advanced into the grade of scholastics, corresponding in some degree to that of undergraduates at a university. The ordinary course for these is five years in arts, when, without discontinuing their own studies, they must pass five or six years more in teaching junior classes, not reaching the study of theology till the age of twenty-eight or thirty, when, after another year of novitiate, a further course of from four to six years is imposed, and not till this has been completed can the scholastic be ordained as a priest of the society, and enter on the grade of spiritual coadjutor, assuming that he is not confined to that of temporal coadjutor, who discharges only such functions as are open to lay-brothers, and who must be ten years in the society before being admitted to the vows. The time can be shortened at the general's pleasure, but such is the normal arrangement. Even this rank confers no share in the government, nor eligibility for the offices of the society. That is reserved for the professed, themselves subdivided into those of the three vows and of the four vows. It is these last alone, forming only a small percentage of the entire body, who constitute the real core of the society, whence its officers are all taken, and their fourth vow is one of special allegiance to the pope, promising to go in obedience to him for missionary purposes whensoever and whithersoever he may order—a pledge seriously qualified in practice, however, by the power given to the general of alone sending out or recalling any missionary. The constitutions enjoin, by a rule seldom dispensed with, that this final grade cannot be attained till the candidate has reached his forty-fifth year, which involves a probation of no fewer than thirty-one years for even such as have entered on the novitiate at the earliest legal age. These various members of the society are distributed in its novitiate houses, its colleges, its professed houses, and its mission residences. The question has long been hotly debated whether, in addition to these six avowed grades, there be not a seventh, answering in some degree to the Tertiaries of the Franciscan and Dominican orders, secretly affiliated to the society, and acting as its unsuspected emissaries in various lay positions. This class is styled in France "Jesuits of the short robe," and some evidence in support of its actual existence was alleged during the lawsuits against the company under Louis XV. The Jesuits themselves deny the existence of any such body, and are able to adduce the negative disproof that no provision for it is to be found in their constitutions. On the other hand, there are clauses therein which make the creation of such a class perfectly feasible if thought expedient. One is the power given to the general to receive candidates secretly, and to conceal their admission, for which there is a remarkable precedent in the case of Francis Borgia, duke of Gandia, afterward himself general of the society; the other is an even more singular clause, providing for the admission of candidates to the company by persons who are not themseves members of it. The known facts on either side are insufficient for a decisive verdict and "Not proven" is the only impartial judgment possible. The general, who should by the statutes of the society reside permanently at Rome, holds in his hands the right of appointment, not only to the office of provincial over each of the great districts into which the houses are mapped, but to the offices of each house in particular, no shadow of electoral right or even suggestion being recognized.

The superiors and rectors of all houses and colleges in Europe must report weekly to their provincial on all matters concerning the members of the society and all outsiders with whom they may have had dealings of any sort. Those employed in district missions report at such longer intervals as the provincial may fix. The provincial, for his part, must report monthly to the general, giving him a summary of all details which have reached himself. But, as a check on him, all superiors of houses in his province are to make separate reports directly to the general once in three months, and further to communicate with him without delay every time any matter of importance occurs, irrespective of any information which the provincial may have forwarded. Nor is this all; an elaborate system of espionage and delation forms part of the recognized order of every house, and, in direct contrast to the ancient indictment and confession of faults in open conventual chapter, every inmate of a house is liable to secret accusation to its superior, while the superior himself may be similarly delated to the provincial or the general.

Nor is the general himself exempt from control on the part of the society, lest by any possibility he might prove, from disaffection or error, unfaithful to its interests. A consultative council is imposed on him by the general congregation, consisting of six persons, whom he may neither select nor remove—namely, four assistants, each representing a nation, an admonisher or adviser (resembling the *adlatus* of a military commander) to warn him of any faults or mistakes, and his confessor. One of these must be in constant attendance on him; and, while he is not at liberty to abdicate his office, nor to accept any dignity or office outside it without the assent of the society, he may yet be suspended or deposed by its authority. No such instance, however, has yet occurred in Jesuit history, although steps in this direction were once taken in the case of a general who had set himself against the current feeling of the society. With so widely ramifying and complex a system in full working order, controlled by the hand of one man, the Company of Jesus has been aptly defined as "a naked sword, whose hilt is at Rome, and whose point is everywhere."

There would seem at first to be an effectual external check provided, however, in the fact that, while all the officers of the society, except the council aforesaid, hold of the general, he in turn holds of the pope, and is his liegeman directly, as well as in virtue of the fourth vow, which he has taken in common with the other professed. But such is the extraordinary skill with which the relations of the society to the papacy were originally drafted by Loyola, and subsequently worked by his successors, that it has always remained organically independent, and might very conceivably break with Rome without imperiling its own existence. The general has usually stood toward the pope much as a powerful grand feudatory of the Middle Ages did toward a weak titular lord paramount, or perhaps as the captain of a splendid host of "Free Companions" did toward a potentate with whom he chose to take temporary and precarious service; and the shrewd Roman populace have long shown their recognition of this fact by styling these two great personages severally the "White Pope" and the "Black Pope." In truth, the society has never, from the very first, obeyed the pope, whenever its will and his happened to run counter to each other. Even in the very infancy of the company, Loyola himself used supplications and arguments to the pope to dissuade him from enforcing injunctions likely to prove incompatible with the original plan, and on each occasion succeeded in carrying his point; while his immediate successors more openly resisted Paul IV. when attempting to enforce the daily recitation of the breviary on the clerks of the society, and to limit the tenure of the generalship to three years, and Pius V. when following his predecessor's example in the former respect. Sixtus V. having undertaken with a high hand the wholesale reform of the company, including the change of its name from "Society of Jesus" to "Society of Ignatius," met with strenuous opposition, and the fulfillment of Bellarmine's prophecy that he would not survive the year 1590 was looked on less as the accomplishment of a prediction than of a threat—an impression deepened by the sudden death of his successor, Urban VII., eleven days after his election, who, as Cardinal Castagna, had been actively cöoperating with Sixtus in his plans. The accuracy of a similar forecast made by Bellarmine as to Clement VIII., who was also at feud with the society, and who died before he could carry out his intended measures, confirmed popular suspicion. Urban VIII., Innocent XI., Alexander VIII., and Clement XII. vainly contended against the doctrines taught in Jesuit books and colleges, and could effect no change. Nine popes fruitlessly condemned the "Chinese rites," whereby the Jesuit missionaries had virtually assimilated Christianity to heathenism, and the practical reply of the latter was to obtain in 1700 an edict from the emperor of China, in opposition to the papal decree, declaring that there was nothing idolatrous or superstitious in the inculpated usages, while in 1710 they flung Cardinal Tournon, legate of Clement XI., into the prison of the Inquisition at Macao, where he perished; and finally, they disobeyed the brief of suppression issued by Clement XIV. in 1773, which enjoined them to disperse at once, to send back all novices to their houses, and to receive no more members. It is thus clear that the society has always regarded itself as an independent power, ready indeed to cöoperate with the papacy so long as their roads and interests are the same, and to avail itself to the uttermost of the many pontifical decrees in its own favor, but drawing the line far short of practical submission when their interests diverge.

So constituted, with a skillful combination of strictness and laxity, of complex organization with the minimum of friction in working, the society was admirably devised for its purpose of introducing a new power into the church and the world, and for carrying out effectively every part of its vast programme. Thus equipped, its services to Roman Catholicism has been incalculable. The Jesuits alone rolled back the tide of Protestant advance when that half of Europe which had not already shaken off its allegiance to the papacy was threatening to do so, and the whole honors of the counter-Reformation are theirs singly. They had the sagacity to see, and to admit in their correspondence with their superiors, that the Reformation, as a popular movement, was fully justified by the gross ignorance, negligence, and open vice of the Catholic clergy, whether secular or monastic; and they were shrewd enough to discern the only possible remedies. At a time when primary and even secondary education had in most places become a mere effete and pedantic adherence to obsolete methods, they were bold enough to innovate, less in system than in materials, and, putting fresh spirit and devotion into the work, not merely taught and catechised in a new, fresh, and attractive manner, besides establishing free schools of good quality, but provided new manuals and schoolbooks for their pupils, which were an enormous advance on those they found in use, so that for nearly three centuries the Jesuits were accounted the best schoolmasters in Europe. Whether toiling among the teeming millions of Hindustan and China, laboring among the Hurons and Iroquois of North America, governing and civilizing the natives of Brazil and Paraguay, in the missions and "reductions," or ministering, at the hourly risk of his life, to his coreligionists in England under Elizabeth and James I., the Jesuit appears alike devoted, indefatigable, cheerful and worthy of hearty admiration and respect.

Nevertheless, two most startling and indisputable facts meet the student who pursues the history of this unique society. The first is the universal suspicion and hostility it has incurred—not, as might reasonably be expected, merely from the Protestants whose avowed and most successful foe it has been, nor yet from the enemies of all clericalism and religious dogma, to whom it is naturally the embodiment of all they most detest, but from every Roman Catholic state and nation in the world, with perhaps the insignificant exception of Belgium. Next is the brand of ultimate failure which has invariably been stamped on all its most promising schemes and efforts. It controlled the policy of Spain, when Spain was aiming, with good reason to hope for success, at the hegemony of Europe, and Spain came out of the struggle well-nigh the last among the nations. It secured the monopoly of religious teaching and influence in France under Louis XIV. and XV. only to see an atheistic revolution break out under Louis XVI. and sweep over the nation after a century of such training. It guided the action of James II., lost the crown of England for the house of Stuart, and brought about the limitation of the throne to the Protestant succession. Its Japanese and Red Indian missions have vanished without leaving a trace behind; its labors in Hindustan did but prepare the way for the English empire there; it was swept out of its Paraguayan domains without power of defense; and, having in our own day concentrated its efforts on the maintenance of the temporal power of the popes, and raised it almost to the rank of a dogma of the Catholic faith, it has seen Rome proclaimed as the capital of united Italy, and a Piedmontese sovereign enthroned in the Quirinal. These two phenomena demand some inquiry and analysis. As regards the former of them, the hostility the Jesuits have encountered has been twofold, political and moral or religious. There has been, from a very early date, in their annals, a strong conviction prevalent that the famous motto of the society, "A.M.D.G." (*Ad majorem Dei gloriam*), did not adequately represent its policy and motives, that its first and last aim was its own aggrandizement in power and wealth (for Julius II. had dispensed the general from the vow of poverty, and colleges also were allowed to hold property), and that it spared no efforts to compass this end, even to the extent of embroiling cabinets, concocting conspiracies, kindling wars, and procuring assassinations. In several of these cases, notably as regards the charges which led to their first expulsion from France and Portugal, inclusive in the latter instance of their exile from Paraguay, the Jesuits are able to make one very telling reply, pleading that motives of statecraft alone, of an unworthy kind, and the evidence of untrustworthy and disreputable agents of their enemies, were suffered to decide the matter. In other cases, as for example the assassination of Henry IV. by Ravaillac, they deny all complicity, and no sufficient proof has ever been adduced against them. But, when full allowance has been made for such rejoinders, there remain several counts of the indictment which are but too clearly made out: as, for instance, their large share, as preachers, in fanning the flames of polemical hatred against the Huguenots under the last two Valois kings, their complicity in the plots against the life of Queen Elizabeth which followed on her excommunication by Pius V.; their responsibility for kindling the Thirty Years' War; the part they took in prompting and directing the cruelties which marked the overthrow of Protestantism in Bohemia; their decisive influence in causing the revocation of the Edict of Nantes, and the expulsion of the Huguenots from the French dominions; and their accountability for precipitating the Franco-German war of 1870. And in regard to a large number of other cases where the evidence against them is defective, it is at least an unfortunate coincidence that there is always direct proof of some Jesuit having been in communication with the actual agents engaged.

So it was with the massacre of St. Bartholomew, almost immediately preceded by a visit of the Jesuit general, Francis Borgia, to the French court, though there is no further evidence to connect him therewith; so with Châtel and Ravaillac, the unsuccessful and successful assassins of Henry IV.; so with Jaureguay and Balthasar Gerard, who held the like relation to William the Silent, prince of Orange; so (as is more familiarly known) with the accomplices in the Gunpowder Plot. In all these and several other instances, the precautions which would naturally. and even inevitably, be taken by skilled and wary diplomatists for their own protection are sufficient to account for the lack of direct proof against them, but it is not easy to explain the invariable presence of a Jesuit in the background, on any hypothesis which will secure the complete acquittal of the society from charges of the sort. It is sufficient to say here in illustration that the English Roman Catholics under Elizabeth, addressing the pope with regard to the severe penal laws which oppressed them, laid the whole blame of the government's action on the Jesuits, as having provoked it by their conspiracies; while the secular priests in England issued in 1601 by the pen of one of their number, William Watson (afterward executed in 1603), a pamphlet known as *Important Considerations*, to the same effect.

The merited odium which has overtaken the Inquisition, usually officered by Dominicans, has induced the Jesuits, whose own controversial method has for the most part been different, to disclaim all connection with that tribunal, and to represent their society as free from complicity in its acts. But, in truth, it was IGNATIUS LOYOLA (*q.v.*) himself who procured its erection in Portugal in 1545-46, and F. Nithard, one of the very few cardinals of the society, was inquisitor-general of that kingdom in 1655.

Two causes have been at work to produce the universal failure of the great company in all its plans and efforts. And first stands its lack of powerful intellects. Nothing can be wider from the truth than the popular conception of the ordinary Jesuit as a being of almost superhuman abilities and universal knowledge. The company is without doubt a *corps d'élite*, and an average member of it is of choicer quality than the average member of any equally large body, besides being disciplined by a far more perfect drill. But it takes great men to carry out great plans, and of great men the company has been markedly barren from almost the first. Apart from its mighty founder, and his early colleague, Francis Xavier, there are absolutely none who stand in the very first rank. They have had, no doubt, able administrators, like Acquaviva; methodical and lucid compilers, like the Bollandists and Cornelius a Lapide; learned and plausible controversialists, like Bellarmine; elegant preachers, as Bourdaloue, Segneri, and Vieyra; distinguished mathematicians, like Le Seur, Jacquier, and more lately Secchi; but even their one boldest and most original thinker, Denis Petau, has produced no permanent influence over the current of human thought. They have had no Aquinas, no Anselm, no Bacon, no Richelieu. Men whom they trained and who broke loose from their teaching, Pascal, Descartes, Voltaire, have powerfully affected the philosophical and religious beliefs of great masses of mankind, but respectable mediocrity is the brand on the long list of Jesuit names in the catalogues of Alegambe and De Backer. This result is due chiefly to the destructive process of scooping out the will of the Jesuit novice, to replace it with that of his superior (as a watchmaker might fit a new movement into a case), and thereby annihilating in all instances those subtle qualities of individuality and originality which are essential to genius. Men of the highest stamp will either refuse to submit to the process, or will come forth from the mill with their finest qualities pulverized and useless.

The second cause which has blighted the efforts of the company is the lesson, too faithfully learned and practiced, of making its corporate interests the first object at all times and in all places. The most brilliant exception to this rule is found in some of the foreign missions of the society, and notably in that of St. Francis Xavier. But Xavier quitted Europe in 1541, before the new society had hardened into its final mold, and never returned. His work, so far as we can gather from contemporary accounts, was not done on the true Jesuit lines, though the company has reaped all its credit; and it is even possible that had he succeeded Loyola as general of the Jesuits the institute might have been seriously and healthfully modified. It would almost seem that careful selection was made of the men of greatest piety and enthusiasm, such as Anchieta, Baraza, and Brebeuf, whose unworldliness made them less apt for diplomatic intrigues of the society in Europe, to break new ground in the various foreign missions, where their successes would throw luster on the society, and their scruples need never come into play. But such men are rare, and as they died off, their places had to be filled with more sophisticated and ordinary characters, whose one aim was to increase the power and resources of the society. Hence the condescension to heathen rites in Hindustan and China. The first successes of the Indian mission were entirely among the lowest class; but when Robert de Nobili, to win the Brahmans, adopted their insignia and mode of life in 1605—a step sanctioned by Gregory XV. in 1623—the fathers who followed his example pushed the new caste-feeling so far as absolutely to refuse the ministrations and sacraments of religion to the pariahs, lest the Brahman converts should take offense—an attempt which was reported to Rome by Norbert, a Capuchin, and by the bishop of Rosalia, and was vainly censured in the pontifical briefs of Innocent X. in 1645, Clement IX. in 1669, Clement XII. in 1734 and 1739, and Benedict XIV. in 1745. The Chinese rites, assailed with equal unsuccess by one pope after another, were not finally put down until 1744, by a bull of Benedict XIV. For Japan, where their side of the story is that best known, we have a remarkable letter, printed by Wadding, addressed to Paul V. by Soleto, a Franciscan missionary, who was martyred in 1624, in which he complains to the pope that the Jesuits had systematically postponed the spiritual welfare of the native Christians to their own convenience and advantage, while, as regards the test of martyrdom, no such result had followed on their teaching, but only on that of the other orders who had undertaken missionary work in Japan. Again, even in Paraguay, the most promising of all Jesuit undertakings, the evidence shows that the fathers, though civilizing the Guarani population just sufficiently to make them useful and docile servants, happier, no doubt, than they were before or after, stopped short there, and employed them simply in raising produce to be traded with for the interests of the society, in accordance with a privilege conferred on them by Gregory XIII., licensing them to engage in commerce.

These examples are sufficient to explain the final collapse of so many promising efforts. The individual Jesuit might be, and often was, a hero, saint, and martyr, but the system of which he was a part, and which he was obliged to administer, is fundamentally unsound, and in contravention of inevitable laws of nature, so that his noblest toils were foredoomed to failure, save in so far as they tended to ennoble and perfect himself, and offered a model for others to imitate.

The influence of the society since its revival in Latin Christendom has not been beneficial. It presents the seeming paradox of the strictest and most irreproachable body among the Roman clergy doing nothing to raise the general standard of clerical morals; of that which is collectively the best educated order setting itself to popularize merely emotional and material cults, to the practical neglect and disparagement of more spiritual agencies; of the most intellectual religious teachers deliberately eviscerating the understanding, and endeavoring to substitute mechanical submission to a word of command for intelligent and spontaneous assent to reasonable argument. And yet in all this they are but carrying out the fatal principles of the original institute.

The society has been ruled by twenty-three generals and five vicars from its foundation to the present day; and the most notable fact to signalize with reference to them is that, of all the various nationalities represented in the company, France, its original cradle, has never given it a head, while Spain, Italy, Holland, Belgium, Germany, and Poland were all represented. The numbers of the society at present are not accurately known, but are estimated at about 6,000 in all parts of the world.

The generals of the Jesuits have been as follows:

1.	Ignatius de Loyola (Spaniard)	1541–1556
2.	Diego Laynez (Spaniard)	1558–1565
3.	Francisco Borgia (Spaniard)	1565–1572
4.	Eberhard Mercurian (Belgian)	1573–1580
5.	Claudio Acquaviva (Neapolitan)	1581–1615
6.	Mutio Vitelleschi (Roman)	1615–1645
7.	Vincenzio Caraffa (Neapolitan)	1646–1649
8.	Francesco Piccolomini (Florentine)	1649–1651
9.	Alessandro Gottofredi (Roman)	1652
10.	Goswin Nickel (German)	1652–1664
11.	Giovanni Paolo Oliva (Genoese) vicar-general and coadjutor, 1661; general	1664–1681
12.	Charles von Noyelle (Belgian)	1682–1686
13.	Tirso Gonzalez (Spaniard)	1687–1705
14.	Michele Angelo Tamburini (Modenese)	1706–1730
15.	Franz Retz (Bohemian)	1730–1750
16.	Ignazio Visconti (Milanese)	1751–1755
17.	Alessandro Centurioni (Genoese)	1755–1757

18. Lorenzo Ricci (Florentine)........................1758–1775
    - *a.* Stanislaus Czerniewicz (Pole), vicar-general..1782–1785
    - *b.* Gabriel Lienkiewicz (Pole), vicar-general...1785–1798
    - *c.* Franciscus Xavier Kareu (Pole), (general in Russia, March 7, 1801)..................1799–1802
    - *d.* Gabriel Gruber (German).... 1802–1805
19. Thaddæus Brzozowski (Pole)....................1805–1820
20. Aloysio Fortis (Veronese).....................1820–1829
21. Johannes Roothaan (Dutchman)..................1829–1853
22. Peter Johannes Beckx (Belgian)................1853–1887
23. Anthony Maria Anderledy (Swiss), vicar-general, 1883; general...............................1887

JESUS CHRIST. The word Jesus is the form assumed in Latin by the Greek *Iesous*, which is the transliterated form of the Hebrew Jehoshua, Jeshua, or Joshua, meaning "Jehovah is salvation." In one or other of its forms the name is found in many passages of the Old Testament. It was not, however, borne by any person who rose to historic eminence between the days of Joshua, the son of Nun, and the high priest Joshua, who was the colleague of Zerubbabel at the return from the exile. The prominent position held by Joshua in the later prophetic books seems to have made the name popular. We find frequent traces of it after the exile. During the Hellenizing period, which excited so deep an indignation among patriotic Jews, many of the bearers of the name preferred to adopt the purely Greek analogon Jason, and the name occurs in this form in the New Testament also. Later on it became one of the commonest Jewish names which we find in the New Testament, and again and again in Josephus. There is some reason for believing that the name of Bar Abbas was also "Jesus," although it may have disappeared from the chief manuscripts, partly from feelings of reverence, partly from the mistaken fancy of Origen that we find no sinner among all those who had borne the name. But the name, though common, was meant to be deeply significant of the work for which Jesus was born into the world—namely, to save His people from their sins; and for this reason, in the account of the Annunciation, as given by St. Luke, His mother is expressly bidden to call her babe by this name.

On the other hand, the word Christ was not originally a name, but a title. In the Gospels we scarcely ever read of Christ, but always of "*the* Christ." It was only after the resurrection that the title gradually passed into a name, and "Jesus Christ," or later still "Christ Jesus," becomes one designation. The Greek word means "anointed," and is a translation of the Hebrew "Messiah." The coming Deliverer for whom the Jews had yearned for so many centuries was spoken of as the "anointed one," with special reference to the prophecies of Isaiah and Daniel, which again referred backward to the language of the Psalms. The anointing of Jesus was the special outpouring of the Holy Spirit upon Him, not only throughout His life, but specially at His baptism. Unction was the recognized mode of consecrating anyone to the offices of priest and king; and prophets were supposed to be anointed by God's grace for the fulfillment of their task. The Messiah combined in His office the threefold dignity. He was a prophet to reveal, a king to reign and to judge, and a high priest to offer up the sacrifice of Himself.

Since these, however, were distinctly Jewish conceptions, it was natural that they should be but little understood by the Greeks and Romans. The word "anointed" conveyed to them no sacred conceptions, and it was restamped by them into accordance with their own notions. They fancied that the real name of the founder of the new religion must be *Chrestus* or "excellent," and they constantly spoke of the Christians as "Chrestians." Suetonius says that the Jews were expelled from Rome by Claudius because they were raising seditions at the constant instigation of "Chrestus;" and he cared so little to inform himself on the subject that he made no distinction between Jews and Christians, and seems to have imagined that "Chrestus" was some leader of sedition then living at Rome. On the other hand the Christians in no wise objected to the mistaken designation. "If you call us Christians," said Tertullian, "you bear witness to the name of our master; if you call us 'Chrestians,' you testify to the blamelessness of our lives."

The designation of "the Christ" given to Jesus shows that His followers saw in Him the long-promised Messiah of Judaism; and the rapidity with which the title developed into a name proves the strength and permanence of this conviction. And this much at least is conceded by all, that Jesus more than fulfilled the conditions for which the Jews had hoped in the Deliverer of whom so many prophets had spoken, and that he fulfilled them in a manner transcendently wider, deeper, and more permanent than even the prophets had fully foreseen. Even the most advanced skeptic cannot deny that by His life and teaching He has altered the entire current of human history, and raised the standard of human morality. He was, says Renan, "the individual who had made the species take the greatest step toward the divine" But as His life was passed and His work accomplished, not in a corner, but on the open stage and under the full light of a civilized epoch, it becomes a matter of great importance to estimate the value of the sources from which our knowledge of His life is derived. Those sources are heathen, Jewish, and Christian.

The knowledge derivable from heathen sources, if much smaller than we could have desired, or *a priori* expected, is not smaller than is fully accounted for in the simple and unsophisticated narratives preserved for us by the evangelists and apostles. They show us that Christianity began from the most humble origin, and was regarded by the whole non-Christian world—alike Jewish and pagan—with unconcealed hatred, largely mingled with a contempt which ultimately passed into terror and exasperation. They faithfully record for us the obscure position, the extreme poverty, the persecuted lives, the unlearned training of the apostles, and the disdain to which they were on all sides subjected. The silence of contemporary Gentile and Jewish writers, which would be otherwise inexplicable, finds its undesigned explanation in the New Testament itself, which never attempts to conceal the contemptuous indignation of the Jewish aristocracy, and the lordly indifference of the higher Gentile authorities.

Accordingly, from heathen writers we do not learn a single *new* fact respecting Jesus Christ, while yet all that they do tell us, even when expressed in language of calumny and abhorrence, proves the historical reality of the facts which the Gospels record. If it be true that Napoleon once asked Herder whether Jesus ever lived at all, such a passing phase of incredulity is so perfectly unreasonable that it has long been abandoned even by the most destructive critics. Whether there ever existed any authentic census tables of Quirinius, or any official report of Pilate to the emperor Tiberius or not, Tacitus tells us with perfect accuracy that the founder of Christianity had been put to death in the reign of Tiberius by the procurator Pontius Pilate, and that his religion, which Tacitus calls a "deadly superstition," "though crushed for a time, burst forth again, not only throughout Judæa, in which it sprung up, but even in Rome, the common reservoir for all the streams of wickedness and infamy."

From Jewish writers we can glean similar confirmation of the gospel story. Philo indeed is silent. The legends preserved by Eusebius—that Philo had met St. Peter in Rome during his mission to the emperor Caius, and that in his book on the contemplative life he is describing not the life of the Essenes and Therapeutæ, but those of the Christian Church in Alexandria founded by St. Mark—are valueless. It is extremely probable that Philo had scarcely heard either of Christ or of the Christians. He died after 40 A.D., but at that period Christianity had hardly emerged into the recognition claimed by prominent historical phenomena. The writings of Philo are valuable, not for any light which they throw on the gospel histories, but for the evidence which they afford of prevalent modes of thought and phraseology, in which some even of the apostles shared. When, however, we turn to Josephus, we find in his writings, as now extant, no less than three allusions to events in the gospel history. It cannot be decided with certainty whether two of these passages are genuine as they now stand, but modern opinion tends to the view that in each of the actual allusions to Jesus there is a genuine basis with later Christian interpolations. The passage in which he speaks of the preaching and execution of John the Baptist is not disputed, and it is very important as showing that Josephus must have been perfectly well acquainted with the facts of Christ's life, and that he has passed them over in his usual unscrupulous way, with a reticence due only to dislike or perplexity. For in speaking of St. John's preaching he deliberately, and, it must be feared, dishonestly, excludes the Messianic element from which it derived its main power and significance. In another passage he mentions with strong disapproval the judicial murder by the younger Annas of James the Just, "the brother of Jesus, called the Christ." The passage was early tampered with by Christian interpolators who wished to make it a more emphatic testimony in favor of Christ, but in its present form its genuineness is undisputed. Respecting the third passage, in which Josephus speaks directly of Jesus, the only question is whether it be partly or entirely spurious. Placing in brackets the words which are undoubtedly interpolated, it runs as follows:—

"At this time appeared a certain Jesus, a wise man [if indeed He may be called a man, for He was a worker of miracles, a teacher of such men as receive the truth with joy], and He drew to himself many Jews [and many also of the Greeks. This was the Christ]. And when at the instigation of our chief men Pilate condemned Him to the cross, those who had first loved Him did not fall away. [For He appeared to them alive again on the third day, according as the holy prophets had declared this and countless other marvels of Him.] To this day the sect of Christians, called after Him, still exists."

That Josephus wrote the whole passage as it now stands no sane critic can believe. Vespasian, not Jesus, was the Messiah of the "ambiguous oracle" of that apostate Jew. There are, however, two reasons which are alone sufficient to prove that the whole passage is spurious—one that it was unknown to Origen and the earlier fathers, the other that its place in the text is uncertain. It is now found after the historian's notices of Pilate, but the remarks of Eusebius show that in his time it was found before them.

From other Jewish sources not a single fact about Jesus can be gleaned. In the unexpurgated editions ot the Talmud there are about twenty allusions to Christ and the Christians characterized by intense hatred. He is usually spoken of indirectly as "that man," "the Nazarene," "the fool," "Absalom," "the hung," "the son of Stada," "the son of Pandera." Many allusions to Him are veiled in cryptographs of which the key is in the possession of but few. All the grossest fictions respecting him—that he was a seducer (*mesîth*) who had learned magic in Egypt, and had been excommunicated by Rabbi Joshua ben Perachia in the reign of Alexander Jannæus (nearly a century before His birth!), and that He was crucified at Lydda, because no one, during forty days, came forward to give any evidence in his favor—are collected in a miserable Jewish tract called the *Toldoth Jeshu*, which may be consigned to oblivion, because even the Jews now regard it with contempt and shame. It is, however, remarkable that from these intensely embittered Jewish sources we derive an absolute confirmation of Christ's stay in Egypt, of His Davidic descent, of His miracles, of His disciples, of his excommunication by the Sanhedrin, of His crucifixion on the evening before the Passover, and even of His innocence—for not a single crime but that of working miracles by magic, and claiming divine honor, is, even in these sources, laid to His charge. And thus even from pagan and Jewish enemies we derive all that we want and all that we could expect in the recognition of the historic personality of Christ, and of the chief facts in His outward life.

If we had nothing to help us but these allusions, the two great facts of Christianity and Christendom would be an inexplicable enigma. In the Christian sources of information all becomes intelligible. Of these we may dismiss for practical purposes all but the New Testament. From the fathers we derive surprisingly little. A few sayings—of which some are very dubious, and of which the most valuable are only variations of those in the Gospels—and one or two highly uncertain incidents, are all that we can glean from them. The Apocryphal Gospels help us still less. They are for the most part heavy fictions, the inventions of an indiscriminate curiosity, often grossly heretical, abounding in coarsely conceived and even pernicious miracles, and dwelling chiefly on imaginary details of the nativity, the infancy, or the last scenes. Their chief value is to set forth by contrast the immeasurable superiority of the canonical Gospels. But it is not the Gospels alone on which we have to depend. We have four works of which the authenticity has never even been assailed by any serious writer, namely, St. Paul's four epistles to the Galatians, Romans, and Corinthians. These may truly be regarded as a fifth Gospel, of which the testimony is all the more valuable because it is undesigned and incidental. It is also earlier than that of any Gospel, and is the testimony of one whose personality stands forth with absolute clearness in the light of history. Further than this, it is the testimony of a man of commanding intellect and of the highest Jewish culture, who, after the death of Christ, was converted from the most bitter hostility to the most intense devotion, and who bears his witness within twenty-five years of the events respecting which he speaks. And yet, if we had the epistles of St. Paul alone, we could find a contemporary testimony to almost every single fact of primary importance in the life of Christ—His birth of the seed of David, His poverty, His Messiahship, His moral teaching, His proclamation of the kingdom of God, His calling of the apostles, His supernatural power, His divine claims, His betrayal, His founding of the Last Supper, His passion, crucifixion, burial, resurrection and repeated appearances. If we add the testimony of the other epistles, we have further testimonies to almost every fact of importance in the Gospels, as we have also in the catholic epistles and in the Revelation of St. John.

It is, however, from the Gospels that our fullest light is derived. They are not, and do not profess to be, full biographies written for the gratification of curiosity, but they preserve for us all that is necessary to explain the origin of Christianity in the life of its Founder. In the first three Gospels, called Synoptic, we have sketches of the life and teaching of Christ of which the latest was probably written within forty years of the crucifixion. No one has ever denied that the representation of Christ in these three Gospels is essentially the same. The view of Him presented in the Fourth Gospel, which was not published till toward the close of the first century, is more subjective. It is the spiritual Gospel, the Gospel for the church, and even those critics who deny its Johannine authorship admit its value as a very ancient document written by a Jewish Christian of extraordinary genius who had access to the most valuable sources of contemporary information.

It must be admitted that we cannot demonstrate the exact year of the nativity, but critics of all schools are verging more and more toward the acceptance of 4 B.C. as the probable year of Christ's birth. Our present era was fixed (525 A.D.) by a learned Scythian, Dionysius Exiguus, who was an abbot at Rome, and died about 550; but it is now admitted to be erroneous by at least four years. We are left with two data which furnish us with an approximation to the accurate date. One of these is the death of Herod the Great. Josephus tells us that he died thirty-seven years after he had been declared king by the Romans. Now this took place A.U.C. 714, and therefore—by the Jewish mode of reckoning the year from Nisan to Nisan, and counting fractional parts of a year as a whole year—he must have died between 4 B.C. and 3 B.C. Further, we know that there was an eclipse of the moon on March 12, 4 B.C., on which night Herod ordered some Jewish rabbis to be burnt for urging their pupils to destroy his golden eagle, and that he was dead before the passover which took place on April 12, 4 B.C. Christ must therefore have been born before February, 4 B.C. Again, St. Luke tells us that John the Baptist began to preach in the fifteenth year of Tiberius, and as the reign of Tiberius was usually reckoned in the provinces from the date of his association with Augustus in the empire, this gives us A.U.C. 780 for the baptism of John, at which period Jesus was about thirty years old. As to the day and month of the nativity it is certain that they can never be recovered; they were absolutely unknown to the early fathers, and there is scarcely one month in the year which has not been fixed upon as probable by modern critics. The date now observed—December 25—cannot be traced further back than the middle of the fourth century, but was adopted by St. Jerome, St. Augustine, Orosius, and Sulpicius Severus, and in the East by St. Chrysostom and St. Gregory of Nyssa. If 4 B.C. be accepted as the date for the nativity, which has most probability in its favor, the question of the date of the crucifixion depends mainly on that of the duration of the ministry. Now on this point the data of the evangelists have been disturbed by a prevalent early tradition that Christ's public ministry only lasted one year, and by another tradition that Jesus did not die till the age of fifty. The first of these notions is a mistaken inference drawn by Clement of Alexandria, Origen, and other fathers, as also by the Valentinians, from Luke iv. 15· and it was by no means universal even in early days, for Irenæus says that Christ taught for three years. The other notion was a mistaken inference from John viii. 57. That both views are mistakes appears from the positive testimony of St. Luke that Jesus was about thirty years old when he began His ministry, and from the clear indications given by St. John (ii. 13, vi. 4, xi. 55) that there were at least three passovers during the public ministry. On other grounds it is probable that there was one passover during the ministry which our Lord did not attend; and if so, we see the grounds for the ancient tradition that His public preaching lasted upward of three years, and that Jesus died at the age of thirty-three. He died during the reign of Tiberius, the procuratorship of Pontius Pilate, the tetrarchate of Antipas, and the high-priesthood of Joseph Caiaphas. Now Tiberius died on March 16, 37 A.D., and Pilate ceased to be procurator before, and Caiaphas to be high priest immediately after the passover of 36 A.D.; the date therefore cannot be later than 35 A.D. We may set aside dubious considerations derived from the allusion to an eclipse and earthquake by the pagan historian Phlegon, and may regard it as highly probable that the crucifixion took place at the passover of March 30 A.D.

The circumstances of the nativity are only related by St. Matthew and St. Luke, and by each of them in a manner so absolutely independent that facts known to the one may have been unknown to the other. There is no difficulty in reconciling their fragmentary intimations if we suppose that Nazareth was the native place of Joseph and Mary, and that there the coming nativity was announced to the Virgin, but that the exigencies of the enrollment undertaken by Quirinius for imperial purposes required Joseph to register his name at Bethlehem, the native town of David, from whom both he and, probably, his espoused wife were descended.

The life of Jesus naturally falls into five epochs:—(1) the infancy and childhood; (2) the youth and early manhood; (3) the public ministry, including (4) the closing scenes and crucifixion, and (5) the resurrection and ascension. These epochs are well marked in the Gospels.

The two who alone preserve for us any details of the infancy and childhood are St. Matthew and St. Luke, and they relate four events. Of these the circumcision and the presentation in the temple present no difficulties. The circumcision, at which the name was always publicly given, took place on the eighth day after the birth, and was performed in the presence of the nearest friends. It illustrated the truths that Christ was "born under the law" which he came "not to destroy but to fulfill." Thirty-three days after the circumcision was the purification in the temple, and St. Luke tells us how the aged Simeon and Anna welcomed the infant Saviour with words of prophecy. The third event, the visit of the Magi, is known as the Epiphany or manifestation of Christ to the Gentiles.

It rests on the sole authority of St. Matthew, but there is no feature in his account which is out of keeping with known events and possibilities. The Magi, Persian or Chaldæan astrologers, were a class extremely common at that epoch, and under different names are repeatedly mentioned by the contemporary historians and satirists. That they were accustomed to wander to various countries, and to interest themselves in horoscopes, we know from the story of Diogenes Laertius that a Syrian magus had foretold his death to Socrates, and from Seneca's statement that magi, "who then chanced to be at Athens," had visited the tomb of Plato, and offered incense to him as to a divine being. That they should have been deeply interested in any sidereal phenomenon is in accordance with what we know of their studies, and that a sidereal phenomenon of the rarest kind, and one which, by the recognized rules of astrology, was of stupendous significance, actually did occur at this very epoch we know by the independent and, so to speak, accidental investigations of the great Kepler. The conjunction of planets which occurred on December 17, 1613, was followed the next year by the appearance of a new evanescent star of the first magnitude in the foot of Opiuchus, which first attracted the notice of Kepler's pupil Brunowski, and continued to shine for a whole year. Such phenomenon may have some bearing on the "star of the wise men," although, taken alone, it will not minutely correspond with the language of St. Matthew. But that such an astrological event would naturally turn the thoughts of these Chaldæans to some great birth, and that its occurrence in the sign of the zodiac which astrology connected with the fortunes of Judæa should turn their inquiries thitherward, is again in accordance with the tension of Messianic expectations in those days, which especially affected the East, but which has left deep traces even on the pages of Roman writers. Again, the answer of the Jewish rabbis to these inquirers is in exact accordance with their own anticipations.

The sequel of the story—Herod's jealousy and the massacre of the innocents—has been mainly doubted because it is not mentioned in Josephus. But there must have been hundreds of events of that day of which the Jewish historian has taken no notice, though they were far more sanguinary than the murder of a handful of infants in a little village. The act corresponds to the jealousy and cruelty which were the master passions of the Idumæan usurper, and, if Josephus here follows Nicolaus of Damascus, we may be quite sure that he would not have mentioned a fact so damaging to the character of his patron. There are, however, two allusions in Josephus, which, if they do not specifically indicate this event, yet may well allude to it, or at least show how consonant it was with Herod's impulses. Further, Macrobius speaks of "the boys under two years of age (comp. Matt. ii. 16) whom Herod ordered to be slain in Syria," and, although he confuses this with the sentence upon Herod's sons, of whom Antipater was executed within five days of Herod's death, his words may point to the murder of the children of Bethlehem. That Joseph should have fled with Mary and the child into Egypt was exactly what would have been done by every Jew similarly circumstanced. Three days' journey, as far as the Wady Rhinocolura, would have placed the fugitives beyond the reach of Herod's jurisdiction.

The sojourn of the holy family in Egypt was probably very short, nor indeed would there have been any temptation to stay a day longer than was necessary. Joseph's first intention was to return to Bethlehem when the news that Herod the Great was dead seemed to open the prospect of happier times. But when he was met on the way by intelligence that Judæa had fallen by his father's will to the share of the cruel Archelaus he was afraid to establish himself so near to the palace of that jealous tyrant, and "retired" (ἀνεχώρησεν) to the mountain seclusion of remote and despised Nazareth.

At Nazareth He who, even as a mere matter of history, was to influence forever the entire development of human civilization grew up in extreme seclusion. A single anecdote and two or three incidental expressions comprise every glimpse of Him which we can obtain. We learn that "He was subject to His parents" at Nazareth; that "He grew and waxed strong in spirit, filled with wisdom, and the grace of God was upon him;" that "He gradually advanced (προέκοπτε) in wisdom and stature, and in favor with God and man." We further learn that He was not subjected to the training of any of the rabbinic schools. It is certain that He knew both Greek and Aramaic, which were at that time universally spoken throughout Palestine; and there are slight indications that He was acquainted with Latin and with Hebrew, though the latter had now become a dead and learned language. We also find that He was acquainted with the then by no means common art of writing.

At the age of twelve a Jewish boy was held to have finished the elementary stages of his education, and became a "son of the law." At this age He was presented by his father in the synagogue, began to wear the phylacteries, learned a trade for His own support, and "advanced," as the Jews phrased it, from the study of the Scriptures to that of the oral law. At this age Joseph and Mary took Jesus for the first time to Jerusalem, and there occurred the memorable incident of the temporary loss of Him by his mother and Joseph, and their discovery of Him in the Temple seated among the doctors, "both hearing and asking them questions."

Of the remaining life of Jesus during the period between this visit to Jerusalem and His baptism one word alone remains to us. It is in the question, "Is not this the carpenter?" in Mark vi. 3. It shows us that these eighteen years of youth and opening manhood were spent, not only in the obscurity of a despised provincial village, but also in the manual toils of an humble trade.

At the epoch of Christ's birth the heathen world had sunk into practical atheism, and the Jewish world was deeply corroded by formalism and hypocrisy. In the heathen world religion had almost ceased to exist; in the Jewish world it was tainted at its source.

At this time of extreme trouble and expectation the Baptist began his preaching. It was confessedly preparatory. The coming of the Messiah was always declared to depend on the "righteousness" of the nation, that is—in ordinary Jewish phraseology—their rigid observance of the Mosaic law. The submission to the simple rite of baptism, a rite already familiar to the Jews in the admission of proselytes, was the only sign of the acceptance of his mission which he required; and the multitudes were so deeply moved by his preaching that they thronged to be baptized of him in Jordan, confessing their sins. It was in order to receive this baptism, and to ratify the mission of the great forerunner, that Jesus left the deep provincial seclusion in which He had hitherto lived. The stainless personality of his kinsman overawed the bold and mighty spirit of the desert preacher. He shrank from baptizing one in whom he at once recognized that "royalty of inward happiness," and purity of sinless life, which he could not himself claim. Jesus, however, though He had no sins to confess, bade John to baptize Him, "for thus it becometh us," He said, "to fulfill all righteousness."

After this great crisis, which finally closed the private period of the life of Jesus, He was "driven" by the spirit into the wilderness for His mysterious temptation. The details of what occurred could of course only have been derived from what He Himself made known to His apostles.

After this victory over the power of evil, Jesus returned to the fords of Jordan. It will not of course be possible or needful to dwell on the narratives of His ministry in all their details; but, since these narratives are confessedly fragmentary, we shall endeavor to furnish from the four Gospels in rapid outline a sketch of the general events of His ministry. The ministry of Christ falls into the following epochs:—(1) the early scenes, narrated by St. John alone, until the beginning of the public preaching in Galilee; (2) the Galilæan ministry till the murder of the Baptist; (3) the period of decided opposition; (4) the period of flight and peril until the final farewell to Galilee; (5) from the great journey to Jerusalem till the retirement to Ephraim; (6) from this retirement to the Passover; (7) the last supper, passion, trial, and crucifixion; (8) the resurrection and ascension.

Although Jesus was aware that a prophet is often least known in his own country and among his own kindred, He made His way, preaching as He went in various synagogues, direct to Nazareth. There, in the synagogue, He read aloud part of Isaiah lxi., and amid deep silence applied it to Himself. Something in the majesty of His bearing seems to have created in the minds of the people a supernatural awe, so that, as on later occasions, He was "able to pass through the midst of them, and go on His way." To the place of His birth He seems never to have returned.

From this time His home, so far as He could in any sense be said to have a home, was at the bright little city of Capernaum on the shores of the Sea of Galilee, to which, perhaps in consequence of the churlishness of the Nazarenes, His mother and brethren also migrated. At this point begins the period of His brightest activity. On the way to Capernaum Jesus healed by His word the son of the courtier of Herod, who in consequence believed with his whole house. Much of the brief story of the Gospels is made up of the records of single days which stood out with marked prominence. One such day was the first Sabbath at Capernaum. Christ began with a sermon in the synagogue, during which He wrought one of His great exorcisms on a raving demoniac who was present in the audience. Retiring to the house of Peter, He healed Peter's mother-in-law of a fever, and at sunset, when the Sabbath ended, wrought many cures upon a multitude of sufferers. The fame of this day rang even to Syria, and, finding that even temporary seclusion was now impossible, Jesus went from village to village preaching the kingdom of God. It was at this time that He preached to the multitude from Peter's boat, and after the miraculous draught of fishes called Andrew, Peter, and the sons of Zebedee to a closer and more unremitting discipleship. Matthew the publican was the next to "leave all" and follow Christ. The choice of the full number of twelve to be apostles took place just before the sermon on the mount. The great discourse known as the Sermon on the Mount was delivered primarily to the disciples, but was intended also for the multitude. The hill by the Galilæan lake was the Sinai of the new dispensation, but it was a mount not of terrors but of beatitudes. From this time He was constantly surrounded by thronging multitudes, and was constantly appealed to for miracles of compassion. We are told in quick succession of the healing of a leper by a touch, of the centurion's servant by a word, and the raising from the dead of the widow's son at Nain; and so incessant was His activity that His mother and His brethren began to be alarmed. Soon after the miracle at Nain He received the deputation from John the Baptist, then in his gloomy prison at Machærus, to ask whether He were indeed the Messiah. He bade the messengers take back no other answer than the works which they had witnessed or heard, and preëminent among them was the preaching of the gospel to the poor. He contrasted the glad and natural geniality of His own example—as one who came "eating and drinking"—with the asceticism and gloom of the Baptist. He never refused the invitations even of the Pharisees, and it was at the banquet of a Pharisee named Simon that He accepted the pathetic devotion of the "woman that was a sinner" (whom Christian tradition persistently identifies with Mary of Magdala), and rebuked the haughty and untender formalism of His host. His life during this period, as He wandered about Gennesaret and its vicinity, preaching to rejoicing crowds, was a life of poverty, toil and simplicity.

It was probably at this point of the ministry that there occurred the visit to that unnamed feast at Jerusalem, which was almost certainly the Feast of Purim. Perhaps with a view to this absence from Galilee He sent out the twelve, two and two, to preach and perform works of mercy in His name, sending them "like lambs among wolves," and bidding them set the example of the most absolute contentment and simplicity. During His visit to Jerusalem, where—as we learn from St. John, whose facts are incidentally confirmed by allusions in the Synoptists—He had many friends and followers. He healed the impotent man at the Pool of Bethesda, and excited the bitter enmity of the Jews by deliberately ignoring the exaggerated minutiæ of the traditional law which made them regard it as a heinous crime to carry even the smallest burden on the Sabbath. The simple command to the healed man to take up the mat on which he lay and walk aroused the Jews to fury; and from that incident, as St. John expressly tells us, the overt persecution of Jesus began. He seems to have been summoned before some committee of the Sanhedrin, but on this occasion they did not dare to punish His violation of their tradition, and on the contrary had to listen in unavailing wrath, not only to His irresistible defense of what He had done on the Sabbath, but to Divine claims which they declared to be blasphemy. They did not dare to touch Him, knowing His power with the people, but from that day the leading authorities of Jerusalem seem to have determined on His death, and their hostility was so bitter and persistent that He left Jerusalem without waiting for the approaching passover.

The remainder of his life was mainly spent in flight, in peril, and concealment, only broken by brief occasional appearances in Galilee and Jerusalem. He departed from Capernaum, and went into the heathen region of Tyre and Sidon. But few particulars of this period are recorded. Somewhere in those regions He tested the strong faith of the Syro-Phœnician woman, and healed her demoniac daughter. From Tyre and Sidon He wandered southward again, keeping mainly to the eastward and less inhabited region, only now and then healing a sufferer, but gradually attracting crowds once more. Somewhere on the Peræan side of the lake He fed the four thousand. After this period of wandering and absence He once more sailed to Magdala, but was met immediately by the ominous conjunction of Herodians and Pharisees with their hostile demand for a sign. Turning away from them, He uttered His last sad farewell and prophecy to the cities in which He had labored, and once more journeyed northward. During this journey they came near to Cæsarea Philippi, and, after standing in silent prayer, He asked His disciples: "Whom do men say that I, the Son of man, am?" The sorrowful confession had to be made that, though they recognized Him as a prophet, they had not recognized Him as the Messiah. Then came the momentous question, which was to test how much of His task was accomplished in the hearts of those apostles whose training had now for some time been his principal work: "But whom say ye that I am?" Then it was that Peter gave that which has henceforth been the answer of all the Christian world: "Thou art the Christ, the Son of the living God."

Christ did not leave Ephraim till He could join the great caravan of Galilæan pilgrims with whom He could proceed in safety to His last passover. His apostles, both from His own warnings and from the visible grandeur of His transfiguration of self-sacrifice, were well aware that a crisis of His career had now arrived; and nothing can show more clearly the mistaken character of their Messianic hopes than the fact that, though He now distinctly told them the crowning horror that He should be crucified, the sons of Zebedee came with their mother Salome to beg for places at His right hand and His left in His kingdom. Jesus made their ambitious request a theme for rich and solemn teachings on the beatitude of suffering for the cause of God and man. As they approached Jericho, accompanied by excited multitudes, He healed the blind Bartimæus, and in Jericho He excited the murmurs of the crowd by accepting the hospitality of the publican Zacchæus. On the road between Jericho and Bethany He delivered the parable of the pounds. He arrived at Bethany probably on Friday, Nisan 8, A.U.C. 783 (March 31, 30 A.D.), six days before the passover, and before the sunset had begun the Sabbath hours. The Sabbath was spent in quiet. In the evening Martha and Mary gave him a banquet in the house of Simon the leper, at which Mary, in her devotion and gratitude, broke the alabaster vessel of precious ointment over His head and feet, and so awoke the deadly avarice of Judas that he seems on that very evening to have communed with the Jewish priests for the paltry blood-money of thirty pieces of silver (less than $20) for which he was willing to betray Him. On the morning of Palm Sunday Jesus made His triumphant entry into Jerusalem, and at the point of the road where the city first bursts upon the view He paused to weep over it and prophesy its doom. After once more cleansing the temple, and protecting from the anger of the priests and Pharisees the children who still shouted Hosanna, He spoke to Philip about the Greeks (probably from Edessa) who wished to see Him, and, strengthened by a voice from heaven, spent the rest of the day in teaching. At evening He retired for safety with the twelve outside the city walls in the direction of Bethany. On the Monday morning, as He went to Jerusalem, He pronounced the symbolic doom upon the fig-tree which had only leaves. On entering the temple He was met by a formidable deputation of priests, scribes, and rabbis, who demanded "by what authority He was acting"—a question which He declined to answer until they proved their right to ask it, by giving a definite opinion respecting the baptism of John. At evening He again retired from the city. The next day, the Tuesday in Passion week, may be called the day of temptations, for it was marked by three deliberate attempts to undermine His authority by involving Him in some difficulty either with the rulers or the people. In the morning walk to Jerusalem He taught to His disciples a lesson of faith from the withered fig-tree. In the temple He was first met by the plot of the Herodians and Pharisees to embroil Him either with the Romans or the populace by a question as to the lawfulness of paying tribute, then by a piece of poor casuistry on the part of the Sadducees concerning the resurrection, then by the question of a Scribe as to the great commandment of the law. In each instance the divine and ready wisdom of His answers not only entirely defeated the stratagems of the Sanhedrists, but showed His immeasurable superiority to them in knowledge and insight. And then, knowing that the time had come when their degradation of religion into a mere tyranny and semblance should be set forth, He delivered the terrible denunciation which, with its eightfold "Woe unto you, Scribes and Pharisees, hypocrites," was intended to leave them utterly inexcusable. The Jewish authorities felt that this was a final rupture, that they must now, at all costs, bring about His immediate death.

Before He left the temple forever he taught the lesson of true charity as illustrated by the widow's mite, and then went and sat on the green slopes of the Mount of Olives. There he pronounced to His disciples that great eschatological discourse which was suggested by their admiration of the temple buildings, destined so soon to sink in blood and ashes. In the cool of the evening they walked to Bethany, perhaps at the very time that Judas was arranging with the priests the final details of His betrayal and arrest. The Wednesday was spent in deep retirement at Bethany, and not a single word or incident is recorded on that day. On the Thursday morning He woke never to sleep again.

On the evening of Thursday Jesus went with His disciples to Jerusalem to keep that quasi-paschal feast at which He instituted the sacrament of the Eucharist. Even then the apostles had jealousies about precedence, and it was to cure them of their fatal tendency to selfish pride and ambition that he washed the disciples' feet. During the supper he first indicated to John, and through him to Peter, that He knew who the traitor was. He clearly told them that this was the last meal which He should eat with them, and bade them henceforth "eat bread and drink wine" in sacramental memory of Him. Then the torches suddenly flashed upon the night as the traitor, accompanied by priests and their servants, and Levites of the temple guard, and Roman soldiers, made their way across the valley of the Kidron to the slope of Olivet on which the garden lay. There Judas betrayed Him with a kiss; and, in spite of the supernatural awe which His presence inspired even in His enemies, He resigned Himself into their hands, rebuked the rash blow of Peter, and by one last act of mercy healed the slight wound of Malchus. "Then all His disciples forsook Him and fled."

He was taken first to the astute and aged Annas, who was regarded as high priest *de jure*, though not *de facto*. From this time forward it was the priestly party—the Sadducees, not the Pharisees—who were almost exclusively responsible for His death. On His refusal to plead before this disorderly midnight tribunal, He was struck on the mouth; and, failing to extort anything from Him, Annas sent him bound across the courtyard to his son-in-law Caiaphas, the *de facto* high priest.

It was still night, and here took place the second irregular and illegal trial, before His worst enemies among the priests and Sadducees. The false witnesses who endeavored to convict Him of having threatened to destroy the temple failed, and He preserved unbroken silence until Caiaphas adjured Him by the living God to tell them whether He was the Messiah, the Son of God. In answer to this appeal He said "I am," and told them that they should see His return hereafter in the clouds. Then Caiaphas rent his robes with the cry of blasphemy, and this committee of the Sanhedrin declared Him "guilty of death."

After this second examination Jesus was remanded to the guardroom until break of day, before which time the whole Sanhedrin could not meet. As He was led past the brazier in the courtyard, His one glance broke into penitence the heart of his backsliding apostle, who had just denied Him with oaths. As He waited, He was insulted by the coarse derision and brutal violence of the priestly menials. When the Sanhedrin met, they once more entirely failed to fix any charge upon Him, until He renewed in their presence His claim to be the Son of God. He was then formally condemned to death, and underwent a second derision at the hands of the assembled elders. It was after this condemnation that remorse seized the dark soul of Judas. He flung down the blood-money before his tempters, and with an agonized confession of guilt rushed out to his terrible suicide.

At this period the Jews had lost all legal right to put anyone to death, and they were further anxious to avoid personal responsibility, and danger of vengeance from the followers of Jesus, by handing Him over for execution to the Roman procurator. Accordingly they led Him bound to Pilate in imposing procession. They were, however, mistaken in supposing that Pilate would crucify Jesus at their bare word without seeing whether

He was guilty; and, as they could not enter the Herodian palace, in which the Gentile ruler lived, without pollution, which would have prevented them from partaking in the passover that evening, Pilate went out to them. In every line of the brief colloquy which ensued we trace the haughty contempt of the Roman, and the burning hatred of the Jews. Failing to arrive at any definite charge, Pilate questioned Jesus alone inside the prætorium, and, after a brief examination, came out to the Jews with the declaration of complete acquittal.

In the wild clamor which ensued he caught the word Galilee, and, understanding that Jesus had chiefly taught in Galilee, eagerly seized the opportunity of getting rid of the matter by sending Him to Herod. But before Herod as before Pilate Jesus retained His majestic silence, and, unable to condemn Him, Herod contented Himself with arraying Him in a white festive robe, setting Him at naught with his myrmidons, and sending Him back with a second practical acquittal to the procurator.

Then, in three stages, began the third and most agonizing phase of the public trial. Pilate, seated on his bema upon the marble pavement, declared that, as His innocence was now certain, He would merely scourge and dismiss Him. It was a disgraceful proposal, due partly to his desire to save the life of one whom he saw to be innocent, but dictated by fear of a new riot. Further than this, the warning of his wife, and the awful majesty of the sufferer, had created a strong presentiment in Pilate's mind. But his actions were practically controlled by the past guilt which made him tremble at the thought of the complaints which Jews, Samaritans, and Galilæans could alike prefer against him. He did not therefore venture to refuse the cry of the mob—hounded on as they were by the priests and Sanhedrists—for the passover boon of having a prisoner liberated to them; and he vainly tried to induce them to ask for the liberation of Jesus. They demanded the rebel and murderer Bar Abbas, and began to shout for the crucifixion of Jesus. Bar Abbas was set free, and Jesus underwent the horrible Roman scourging, which was followed by the ruthless mockery of the soldiers, who arrayed Him in an old crimson robe and placed a crown of thorns on His head, and a reed in his hand as a scepter, and so paid Him mock homage as a king of the Jews.

When He came forth after this hour of agony, Pilate made one more appeal to their compassion in the words "Behold the man!" and on hearing that He claimed to be "a Son of God"—for since the charge of treason had broken down, the priests now substituted for it a charge of blasphemy—he became still more alarmed, and once more questioned Jesus in a private interview. For some time Jesus would not speak. When He did, it was to say that He regarded Pilate as less guilty than the Jews. As Pilate led Him forth, and saw Him stand before that shameful yelling multitude in His majesty of solemn woe, he broke forth into the involuntary exclamation, "Behold your King!" That word raised among the multitude some very ominous allusions to Cæsar, and Pilate, after publicly washing his hands, in token that he was innocent of this death, pronounced the fatal order for His crucifixion.

Jesus was then clad in His own garments and led forth with two robbers to be crucified. As He was unable to bear the weight of His cross, Simon of Cyrene was impressed for that service. On His way Jesus gently consoled the weeping daughters of Jerusalem, and, when they reached the fatal spot of Golgotha, He refused the stupefying potion which was offered to Him, and prayed for His murderers even as they drove the nails through His hands. Pilate managed to insult the Jews by putting over the cross the title "The King of the Jews," in three languages, which thus in the presence of the vast passover multitude testified to the truth. On the cross Jesus hung for three hours in agony. The soldiers parted His garments, and cast lots for His seamless robe. The mob, the priests, even the crucified malefactors, joined in taunting Him. But He answered not. After His prayer for His murderers He only spoke to promise paradise to the penitent robber; to assign His mother to the care of the beloved disciple; to quote in the lowest depth of His agony the first words of the 22d Psalm; to give vent to the sole expression of physical anguish which He uttered, "I thirst;" to commend His spirit into His Father's hands; and lastly, in the one victorious word *Τετέλεσται*, "it is finished," to end His work on earth. The bearing of Jesus on the cross, together with the circumstances which accompanied the crucifixion—the darkness, earthquake, and rending of the temple veil—produced a deep impression even on the mind of the heathen centurion. They so powerfully affected the multitude that they returned to Jerusalem wailing and beating on their breasts, at once with a feeling of guilt and a presentiment of future retribution.

At evening the soldiers despatched the two crucified robbers by breaking their legs, in order that their bodies might be removed before the passover. But they found Jesus already dead, and the certainty of His death was assured by one of the soldiers driving his spear into the region of the heart, whence came out blood and water. As very little time was left before the sunset marked the beginning of the Sabbath, and rendered labor impossible, the body of Jesus was hastily buried by Nicodemus and by Joseph of Arimathæa, who had obtained the requisite permission. They wrapped it in fine linen and spices, and laid it in the rockhewn garden-grave of Joseph, rolling a great stone to the aperture, which was further guarded by soldiers sent by the Jews to prevent its removal for purposes of fraud. This was on Friday evening. Very early on the morning of Sunday, while it was yet dark, the two Marys were met at the sepulcher by a vision of angels which announced His resurrection. Of that resurrection, in spite of their original doubts and misgivings, the whole body of the disciples became unalterably convinced, and on their unalterable conviction, and the subsequent witness of history to the blessed truth of their doctrines, has rested in great measure the belief of the Christian church. Uniting the contemporary testimony of St. Paul, who must have been in personal communication with many of the five hundred witnesses to whose evidence he appeals, with those of the Gospels, we find ten recorded appearances:—(1) to Mary Magdalene (John xx. 17); (2) to other women (Matt. xxviii. 9, 10); (3) to Peter (Luke xxiv. 34; 1 Cor. xv. 5); (4) to the two disciples on their way to Emmaus (Luke xxiv. 13-32); (5) to the ten apostles. All these appearances occurred on the first Easter day. On the following Sunday Jesus appeared (6) to the eleven apostles, Thomas having been absent on the previous occasion. He further appeared (7) to seven apostles by the Sea of Galilee (John xxi. 1-24); (8) to more than five hundred at once on a mountain in Galilee; (9) to James (1 Cor. xv. 3, 8); and (10) at the ascension. These appearances continued for forty days. On the last occasion Jesus led His disciples toward Bethany, gave them His last command, blessed them, and as He blessed them passed away, and "a cloud received Him out of their sight."

JESUS, THE SON OF SIRACH (Sirachides), the author of the book of Ecclesiasticus, was a native of Jerusalem, of whose personal life, apart from this one fact, vouched for by himself (Eccles. 1, 27), nothing is known, except that it was devoted to the study of sacred literature. According to indications contained in chaps. xxxiv. 11, 12, xxxix, 4, 5, li. 1, *sq.*, he seems to have traveled abroad, associated with princes, and once at least been placed in danger of his life by intrigues against him at a royal court.

JET, a mineral substance belonging to the carbonaceous group; and generally regarded as a compact variety of lignite, or wood-coal, impregnated with bitumen. The word *jet* is corrupted from *gagates*, the name applied to it, or to a similar substance, by Greek and Roman writers, and derived, according to Pliny, from the river Gages in Lycia, where the mineral was originally found. Its occurrence in Britain is mentioned by Solinus; but it was certainly used there in pre-Roman times. Barrows of the Bronze Age have yielded beads, buttons, rings, armlets, and other personal ornaments of jet. The early supply was probably obtained from the Yorkshire coast, near Whitby—a locality which still yields the finest varieties. At present the material is used only for trivial ornaments, principally for mourning jewelry.

JETTIES are parallel piers, constructed on either side of a river for the purpose of contracting the current and deepening the channel. The system has been in use in Europe for more than a century, but one of the most successful and important works of the kind is that at the mouth of the Mississippi, begun in 1875. The jetties here were built under the superintendence of Capt. James B. Eads, (see Eads, vol. x.) He agreed to create and maintain for twenty years in the South Pass a channel 30 feet deep and 300 feet wide, for which he was to receive $5,200,000, and an annual payment of $100,000 for every year during twenty years that a 30-foot channel should be maintained.

The east jetty is 12,100 feet in length; the west one rather shorter. They were constructed of "mattresses" made of willows and loaded with rubble-stone, and for a greater part of the length four courses of mattresses and stones were laid. At the seaward ends the jetties were protected by massive cribs of logs filled with stone. The work, including that of removing the shoals, was beset with many difficulties, but was carried to a successful completion.

JEW, The Wandering. The legend of a Jew doomed to wander until the day of judgment, for an insult offered to Christ, is first mentioned by Roger of Wendover in the chronicle completed by Matthew Paris, who received the story from an Armenian bishop, who visited England in the year 1228. As told in Matthew's *Historia Major*, the legend runs that the wanderer's name was Cartaphilus, that he was doorkeeper of Pilate's palace, and that as Jesus was led out to be crucified he struck him on the neck, saying, "Go, Jesus, go on faster; why dost thou linger?" Jesus replied, "I go, but thou shalt remain waiting till I return." The Armenian bishop, if his French servant and interpreter is to be trusted, said that this wanderer had dined with him shortly before his leaving home, and that he was now a penitent man and had been baptized by Ananias, who also baptized Paul, under the name of Joseph. At the time of the crucifixion he was thirty years of age; whenever he reaches the age of one hundred he becomes faint, and when he becomes conscious again he is as young as when his doom was pronounced. He never smiles, refuses all gifts, and narrates many ancient events to those who come from far and near to listen. On the same authority rests the somewhat later account by Philippe de Mousket in his *Chronique rimée*. The English chronicler states that the bishop's statement was in reply to a question whether he had seen or heard of one Joseph, said to have been present at the crucifixion to be preserved in the world as a witness of that event. It would appear, therefore, that there was already in existence a legend of an undying Jew, although nothing was intimated of his insult to Christ. The idea of wandering did not enter into the legend until a later period, when persons pretending to be the undying Jew appeared in various parts of Europe. Near the middle of the sixteenth century the legend appears in Germany, brought there by a man who professed to be the "Ewige Jude" himself. He appeared at Hamburg, in 1547, giving his name as Ahasuerus, and stating that he had been a shoemaker in Jerusalem who would not suffer Christ to rest at his door when fainting under the weight of the cross. He struck Jesus, and bade him move on. Jesus said, "I will stand here and rest, but thou shalt go on until the last day." This story, however, also rests upon the authority of an irresponsible reporter. The most important account of any of these monomaniacs or pretenders is that given of one in Paris (1644) by *The Turkish Spy*. "One day I had the curiosity to discourse with him in several languages; and I found him master of all those I could speak. I conversed with him five or six hours together in Arabic." "The common people are ready to adore him; and the very fear of the multitude restrains the magistrates from offering any violence to this impostor." From a letter of Madame de Mazarin to Madame de Bouillon, it appears that an individual appeared in England in the beginning of the eighteenth century professing to have been an officer of rank in Jerusalem who for an insult given to Jesus was doomed to live and wander. It is said that the universities sent professors to cross-examine him, and that many were satisfied of the truth of his story. Several pretenders of the kind appeared in England in the last century.

The Wandering Jew has been a favorite subject of poetry and romance.

JEWEL, or Jewell, John, bishop of Salisbury, was born near Ilfracombe, Devonshire, England, in 1522, and died in 1571.

JEWELRY. Personal ornaments appear to have been among the very first objects on which the invention and ingenuity of man were exercised; and there is no record of any people so rude as not to employ some kind of personal decoration. Natural objects, such as small shells, dried berries, small perforated stones, feathers of variegated colors, were combined by stringing or tying together to ornament the head, neck, arms, and legs, the fingers, and even the toes, while the cartilages of the nose and ears were frequently perforated for the more ready suspension of suitable ornaments.

Among modern Oriental nations we find almost every kind of personal decoration, from the simple caste mark on the forehead of the Hindu to the gorgeous examples of beaten gold and silver work of the various cities and provinces of India.

That the Assyrians used personal decorations of very distinct character, and possibly made of precious materials, is proved by the bas reliefs. In the British Museum we have a representation of Samsi Vul IV., king of Assyria (825 B.C.) He wears a cross very similar to the Maltese cross of modern times. The still more ancient Egyptian jewelry is distinctly brought before us by the objects themselves, placed with the embalmed bodies of the former wearers in sarcophagi, only to be opened in our own time. The most remarkable collection of Egyptian art in this direction is to be found in the jewelry taken from the coffin of Queen Aah-hotep, discovered by M. Mariette in the entrance to the valley of the Tombs of the Kings in 1859, and now preserved in the Búlák museum. In these objects we find the same ingenuity and perfect mastery of the materials as characterize the monumental work of the Egyptians. Hammered work, incised and chased work, the evidence of soldering, the combination of layers of gold plates, together with colored stones, are all there—the handicraft being complete in every respect.

The discoveries of Doctor Schliemann at Mycenæ and at Hissarlik, the assumed site of ancient Troy, supply further illustrations of ancient jewelry and gold work. In extent and in the wonderful character of the design and workmanship, the relics found at Mycenæ present the most perfect examples, although some of the objects brought from the "burnt city" at Hissarlik give evidence of singular skill and ingenuity in the methods of combining the various portions of an ornament and finesse in working the gold.

The gold ornaments found at Hissarlik, in what Doctor Schliemann calls the "Treasury of Priam," partake in most instances of the same characteristics as those found in the sepulchers at Mycenæ. There are necklaces, brooches, bracelets, hairpins, earrings with and without pendants, beads, and twisted wire drops. The majority of these are ornamented with spirals of twisted wire, or small rosettes, with fragments of stones in the centers.

Jewelry and gold work of a very similar character have been found at Cyprus within the last few years by Major Cesnola.

Greek, Etruscan, and Roman ornaments partake of very similar characteristics. Of course there is variety in design and sometimes in treatment, but it does not rise to any special individuality. Fretwork is a distinguishing feature of all, together with the wave ornament, the guilloche, and the occasional use of the human figure. The workmanship is often of a character which modern gold workers can only rival with their best skill, and can never surpass.

The granulation of surfaces practised by the Etruscans was long a puzzle and a problem to the modern jeweler, until Signor Castellani of Rome discovered gold workers in the Abruzzi to whom the method had descended through many generations, and, by inducing some of these men to go to Naples, revived the art, of which he contributed examples to the London Exhibition of 1872, successfully applied to modern designs.

The Merovingian jewelry of the fifth century, the Anglo-Saxon of a later date, and the Celtic as leading to the Gothic or mediæval, have each distinguishing features. In the first two the characteristics are thin plates of gold, decorated with thin slabs of garnet, set in walls of gold soldered vertically like the lines of cloisonné enamel, with the addition of very decorative details of filigree work, beading and twisted gold. The Celtic ornaments are of hammered work, adapted to uses now comparatively unknown, but display another style of workmanship—details in repoussé, fillings in with amber, rock crystal with a smooth rounded surface cut *en cabochon*, with the addition of vitreous pastes. The minute filigree and plaited work, in combination with niello and enamel, communicate to the ornaments of this class found in Ireland and Scotland an unmistakable Oriental spirit alike in design and workmanship.

Rings are the chief specimens now seen of mediæval jewelry from the tenth to the thirteenth century. They are generally massive and simple. Through the sixteenth century a variety of changes arose; in the traditions and designs of the *Cinquecento* we have plenty of evidence that the workmen used their own designs, and the results culminated in the triumphs of Albert Dürer, Benvenuto Cellini, and Hans Holbein. The goldsmiths of the Italian republics must have produced works of surpassing excellence, and reaching the highest point in design as applied to handicrafts of any kind.

During the seventeenth and eighteenth centuries we see only a mechanical kind of excellence, the results of the mere tradition of the workshop—the lingering of the power which when wisely directed had done so much and so well, but now simply living on traditional forms, often combined in a most incongruous fashion. Gorgeous effects were aimed at by massing the gold, and introducing stones elaborately cut in themselves, or clustered in groups. Thus diamonds were clustered in rosettes and bouquets; rubies, pearls, emeralds, and other colored special stones were brought together for little other purpose than to get them into a given space in conjunction with a certain quantity of gold. The question was not of design in its relation to use as personal decoration, but of the value which could be got into a given space to produce the most striking effect.

The traditions of Oriental design as they had come down through the various periods quoted were comparatively lost in the wretched results of the *rococo* of Louis XIV. and the inanities of what modern revivalists of the Anglo-Dutch call "Queen Anne." In the London Exhibition of 1851 the extravagances of modern jewelry had to stand a comparison with the Oriental examples contributed from India. Since then we have learned more about these works, and have been compelled to acknowledge, in spite of what is sometimes called inferiority of workmanship, how completely the Oriental jeweler understood his work, and with what singular simplicity of method he carried it out. The combinations are always harmonious, the result aimed at always achieved; and, if in attempting to work to European ideas the jeweler failed, this was rather the fault of the forms he had to follow than due to any want of skill in making the most of a subject in which half the thought and the intended use were foreign to his experience.

Modern jewelry may be classified under three heads: (1) Objects in which gems and stones form the principal portions, and in which the gold work is really only a means for carrying out the design by fixing the gems or stones in the position arranged by the designer, the gold being visible only as a "setting;" (2) when gold work plays an important part in the development of the design, being itself ornamented by engraving or enameling or both, the stones and gems being arranged in subordination to the gold work in such positions as to give a decorative effect to the whole; (3) when gold or other metal is alone used, the design being wrought out by hammering in repoussé, casting, engraving, or chasing, or the surfaces left absolutely plain but polished and highly finished.

Of course the most ancient and primitive methods are those wholly dependent upon the craft of the workman; but gradually various ingenious processes were invented, by which greater accuracy in the portions to be repeated in a design could be produced with certainty and economy: hence the various methods of stamping used in the production of hand-made jewelry, which are in themselves as much mechanical in relation to the end in view as if the whole object were stamped out at a blow, twisted into its proper position as regards the detail, or the various stamped portions fitted into each other for the mechanical completion of the work. It is therefore rather difficult to draw an absolute line between hand-made and machine-made jewelry, except in extreme cases of hand-made, when everything is worked, so to speak, from the solid, or of machine-made, when the hand has only to give the ornament a few touches of a tool, or fit the parts together if of more than one piece.

A design is first made on paper, or drawn and colored, and when needful with separate enlargement of details, everything in short to make the drawing thoroughly intelligible to the working jeweler. According to the nature and purpose of the design, he cuts out, hammers, files, and brings into shape the constructive portions of the work as a basis. Upon this, as each detail is wrought out, he solders, or fixes by rivets, etc., the ornamentation necessary to the effect. The human figure, representations of animal life, leaves, fruit, etc., are modeled in wax, molded, and cast in gold, to be chased up and finished. As the hammering goes on the metal becomes brittle and hard, and then it is passed through the fire to anneal or soften it, in fact to restore the particles of gold to their original position. In the case of elaborate examples of repoussé, after the general forms are beaten up, the interior is filled with a resinous compound, pitch mixed with fire-brick dust; and this, forming a solid but pliable body underneath the metal, allows of the finished details being wrought out on the front of the design, and being finally completed by chasing. When stones are to be set, or when they form the principal portions of the design, the gold has to be wrought by hand so as to receive them in little cup-like orifices, these walls of gold inclosing the stone and allowing the edges to be bent over to secure it. Setting is never effected by cement in well-made jewelry. Machine-made settings have in recent years been made, but these are simply cheap imitations of the true hand-made setting. Even strips of gold have been used, serrated at the edges to allow of being easily bent over, for the retention of the stones, true or false.

The application of machinery to the economical production of certain classes of jewelry, not necessarily imitations, but as much "real gold" work, to use a trade phrase, as the best hand-made, has been on the increase for many years. Nearly every kind of gold chain now made is manufactured by machinery, and nothing like the beauty of design or perfection of workmanship could be obtained by hand at, probably, any cost. The question therefore in relation to chains is not the mode of manufacture, but the quality of the metal. Eighteen carat gold is of course always affected by those who wear chains, but this is only gold in the proportion of eighteen to twenty-four, pure gold being represented by twenty-four. The gold coin of the realm is twenty-two carat; that is, it contains one-twelfth of alloy to harden it to stand wear and tear. Thus eighteen carat gold has one-fourth of alloy, and so on with lower qualities down to twelve, which is in reality only gold by courtesy.

The application of machinery to the production of personal ornaments in gold and silver can only be economically and successfully carried on when there is a large demand for similar objects, that is to say, objects of precisely the same design and decoration throughout. In hand-made jewelry, so-called, mechanical appliances are only used to economize time and reduce the necessity for the handicraftsman doing that which can be done as well, perhaps better, by some simple mechanical method applied under the hand. In machine-made jewelry everything is stereotyped, so to speak, and the only work required for the hand is to fit the parts together—in some instances scarcely that.

JEWS, MODERN. An outline of the mediæval history of the Jews is given in the article ISRAEL. The modern history of the race in its political and intellectual emancipation begins with Moses Mendelssohn, who flourished at Berlin in the latter part of the eighteenth century. The persecutions of the Middle Ages had produced their natural effect. Cut off from their fellow-citizens, excluded by oppressive laws from all trades except that of peddling in old clothes, and even from buying certain classes of these, specially taxed, confined to Ghettos and Judengassen, strictly prohibited from entering some towns, limited in numbers in others, forbidden to marry except under restrictions designed to check the growth of the Jewish population, disabled from employing Christian servants or being members of trade guilds, the Jews seemed by their abject condition to deserve the evils which were its cause. There were always, it is true, exceptions to the general degradation of the race. The exiles from the Spanish peninsula (who in western Europe were found chiefly in Amsterdam, Bordeaux, Paris, and London, and also in Hamburg and Copenhagen) were in many cases persons of distinguished culture and intelligence, having been enabled, while protected by their disguise of Christianity, to live a life more worthy of freemen than was that of their oppressed and pillaged brethren in the north. In Germany itself Frederick William, the great elector of Brandenburg (1640 to 1688), was indebted for zealous service to Gompertz and Solomon Elias. Beckman of Frankfort-on-the-Oder obtained permission in 1696 to print the Talmud. In Austria Wolf Schlesinger was personally exempted from the decree which banished the Jews from Vienna in the time of Leopold I. The Oppenheimers had sufficient influence in Austria to prevent the publication there of Eisenmenger's libel on their race; the Arnsteins, Sinzheimers, and other families earned the favor of Maria Theresa, and were decorated with titles of nobility. But the general condition of the multitude was shown by the excommunication of Spinoza at Amsterdam, by the rise of the Chasidim and of Frank, and the marvelous history of Sabbathai Zebi. The German Jews grew distrustful of their knowledge of their own religion, and instructed their children by the aid of long-ringleted rabbis from Poland, who overspread the country, inculcating contempt for all except the too subtle dialectics of their peculiar school of disputation. Led by these blind guides, the German Jews continued to speak their own jargon of Hebrew and German, to correspond and even indorse their commercial bills in Hebrew characters, and abandoned the hopeless attempt to enter into the general life of their country. Fortunately, the hereditary desire of learning still survived, though the selection of subjects for study helped to isolate them from their happier neighbors. Moses Mendelssohn (1729–1786), who did so much to induce the Jews to become at one with the spirit of the age, and the Christians to tolerate them, was at three years old taught by his father, a professional copyist of Hebrew religious manuscripts, to repeat the wise sayings of the Talmud. Later on he found in the rabbi Fränkel, of his native town of Dessau in Anhalt, a capable and enlightened teacher. When Fränkel was promoted, the young Mendelssohn followed him at the age of fourteen, to Berlin. In Prussia the condition of the Jews had been comparatively favored. Forty or fifty respectable families fleeing from persecutions in Austria had been admitted to Berlin toward the end of the seventeenth century. The colony increased, and was specially patronized in his own grotesque and tyrannical fashion by the half-mad sovereign Frederick William I. Frederick the Great held the maxim that "to oppress the Jews never brought prosperity to any government," but his "general privilege," issued in 1750, while it abolished some old restrictions, was only a halting step in advance. It divided the Jews into two classes—the hereditarily and the personally tolerated. In the first were those who were actually engaged in commerce or who occupied some office in connection with the synagogue. Their right of abode extended merely to one child of the family. Those who were personally tolerated were men who had means of independent subsistence, though not engaged in commerce, and their right did not descend to their children. The right to residence for a second child of each family of hereditary inhabitants was purchased by the Jews for 70,000 thalers. The restrictions imposed by Frederick on marriage were severe; poor Jews could not marry at all. No Jew was permitted to own land in fee or to possess more than forty houses. Their business was confined to trade in money or goods. Frederick the Great, penetrated as he was by the sentiments of Voltaire, yet struck out Mendelssohn's name when it was put forward for election to the Berlin Academy. Mendelssohn was with difficulty admitted into Berlin when he presented himself at its gates as a poor boy, having no friend but his teacher Fränkel. He went into a silk manufacturer's house as teacher to the children, and became a clerk and afterward a partner in the firm. He formed a warm friendship with Lessing, and inspired the drama of *Nathan the Wise*, in which the Jew was for the first time in modern literature represented in a benevolent light. He translated the Pentateuch into German, and issued his translation in Hebrew characters, added to it a commentary in Hebrew (incorporating the rational as distinguished from the Agadistic interpretations of former Hebrew commentators), partly by himself and partly by others, whom he associated with himself, and by this and other works introduced the Jews to modern culture. At the same time he gained a distinguished place in the world of letters by the pure and exalted tone, and the charming style, of his *Philosopical Dialogues*, his *Phædo, or the Immortality of the Soul*, and other works, which showed him to be at the height of the philosophy of that time. He remained warmly attached in feeling and practice to the synagogue, and was requested by the chief rabbi of Berlin, Hirschel Levin, who for a brief period had been chief rabbi in London, to prepare the German digest of the ritual laws of the Jews, which was ordered by Frederick the Great. Every visitor to Berlin, Jew or Gentile, sought to make his acquaintance at a kind of *salon* which he held in the afternoons. By the great majority of the orthodox Jews the writings of Mendelssohn were received with delight, and it was only by exception (as in Hamburg, Prague, Fürth, and Poland) that they were fiercely denounced as rationalistic in tendency. The times were favorable to the development to which he led the way. The ideas of the great writers who preceded the French Revolution were teaching the abolition of privilege and of religious persecution. Although neither Voltaire nor Bayle wrote in a kindly spirit of the degraded Hebrew race, the general tendency of their teaching was in the direction of toleration, and so it happened that, just at the moment when the Jews were become more than ever willing and ready to enter into the national life of Germany, the country was being prepared to receive them. The civil restrictions were only gradually abolished; painful revivals of hatred recurred from time to time, but henceforth the name of Jew grew year by year to mean less a distinction of nationality, and become more exclusively a denomination, referring merely to ancestry and religious belief.

From minimizing differences in religion some were led to give up their distinctive religion altogether and adopt a nominal, sometimes a real, Christianity, and thus the famous names of Heine, Börne, Edward Gans the jurist, Rahel the younger, Mendelssohn the composer, and Neander the historian pass out of the scope of this article. These celebrated persons belong rather to the general history of German culture than to that of the race from which they sprang. Among the general body of the Jews, the removal of political restriction and a closer communion with modern thought worked noticeable, though less radical, changes. The old system of preaching in the synagogue was revived, and led to the excision of some of the interminable prayers and sacred poems which the piety of preceding ages had accumulated in embarrassing profusion. After the establishment of the consistory in the (French) kingdom of Westphalia, German lectures were held in Cassel, Dessau, Berlin, Hamburg, etc., and now there is scarcely anywhere an important Jewish community without a preacher. Organs were introduced into some synagogues. The alterations brought about disputes in several communities and even secessions, as at Hamburg in 1819. In Prussia, the Government, acting on the principles urged in Mendelssohn's time by his friend Dohm, but vigorously combated by the Jewish philosopher, gave the sanction of state authority to the resolutions of the orthodox. The private synagogue founded in Berlin by Israel Jakobsohn, after the breaking up of the Westphalian consistory, on principles similar to those of the reformed Hamburg Temple, was closed and suffered the same fate when reopened as a public synagogne in 1817 and again in 1823. Even choirs and sermons were prohibited as un-Jewish innovations. Such regulations tended to disgust many educated persons who might otherwise have continued to remain attached to the faith of their fathers. They felt themselves isolated in the midst of their less advanced brethren, and were tempted to identify themselves even in religion with their more cultured Christian associates. Besides, a change of faith offered an escape from humiliating legal restrictions, and opened the way to more dignified careers than those permitted to the conforming Jews. The smaller German states appointed rabbis who were more or less state officials. When the government restrictions were removed, considerable divergences manifested themselves, which the assemblies of rabbis and synods, beginning in 1844, and continued from time to time to the present day, did little to heal. There now exist in most German towns an orthodox and a reform congregation, which differ in their mode of conducting public service, in the prominence given to the belief in the Messiah and the return to the Holy Land, and in their greater or less adherence to the laws of the Sabbath, and laws concerning diet, etc. One reformed congregation in Berlin keeps the Sabbath on the first day of the week.

The universal admission of the Jews to public posts only dates from the establishment of the empire. In the German states the spiritual emancipation of the Jews was not immediately followed by political emancipation. They were freed in Germany by the French law as a result of the conquests of Napoleon, but lost their civil equality when the French retired, to regain it bit by bit in succeeding years. The Leibzoll, the odious tax imposed upon a Jew as often as he crossed the boundary of a city or petty state, even if he went in and out twenty times in the day, was removed in Prussia in 1790, and in other German states in 1803. In 1812 the royal edict declared all Jews in Prussia to be citizens, and gave them equal rights and privileges with their Christian fellow-countrymen. They fought in the war of liberation, but after its success there was a reaction, and the new privileges (more particularly free admission to academic posts) were in part withdrawn. The Jews who had been promoted to the rank of officers during the war had to quit military service to escape the degradation of losing their commissions. The national parliament, which met in Frankfort in 1848, adopted resolutions in favor of the removal of religious disabilities. The Prussian constitution of 1850 declared that the enjoyment of civil rights was independent of religious confession. The legislation with which the empire was inaugurated in 1871 at length gave political and civil equality to the Jews throughout Germany.

The number of the Jews in the German empire is now 520,575, or 1 per cent. of the whole population (census of 1875). The Gemeindebund, or union of congregations for some religious and charitable purposes, has recently been established at Leipsic. The Jews are engaged in all the occupations which other citizens pursue in Germany. While they show a marked predilection for and success in commerce and the learned professions, a few are farmers and sailors. Being subject to the ordinary military laws, they serve in the army, and many Jews hold commissions in those regiments in which noble descent is not a necessary qualification.

While the spiritual awakening of the Jews was essentially a German movement, having its center in Prussia, the most powerful impulse to their political liberation came from France. In 1790 the French Jews united in sending into the assembly a petition demanding their admission to full and equal rights with other citizens. This requisition at first met with some serious opposition even among the advocates of universal liberty; the ancient prejudice against this people had not been entirely eradicated. But the exertions and influence of Mirabeau and Rabaut St. Étienne prevailed. In 1790 the Portuguese Jews, and in 1791 the whole Hebrew population of France were admitted to complete rights of citizenship. The constitution of 1795 confirmed the declarations of the assembly. The gratitude of the Jews was shown by their patriotic devotion in the wars of the Revolution.

In France the absence of political restrictions has been unfavorable to the separate development of Judaism. The ministers Crémieux (1796–1879), Fould, and Goudchaux, the archæologists and philologians Jules Oppert and Halévy and the Darmesteters, the composer Meyerbeer, and many others, are well-known names in the general history of their country. Many Israelites have occupied high civil and military posts. Other Israelites by race have become indistinguishable by religious practice from the main body of the citizens; and the principal contributions in France to Hebrew literature have been from writers born in Germany, like Munk (1802–1867) and Derenbourg, like Samuel Cohen and Franck.

The Jews were readmitted into England by Cromwell on the application of Manasseh ben Israel; and the Spanish and Portuguese Jews from Amsterdam took a lease of ground for a burying-place at Stepney in February, 1657. The first recorded interment was in 1658. The city of London, which was afterward to aid so powerfully in the emancipation of the Jews, petitioned the council in the first years of the restoration to remove the competing Jewish merchants, but, this and other petitions being unsuccessful, a synagogue was built and the copyhold of the cemetery was acquired, although up to fifty years ago doubt was sometimes expressed whether Israelites even if born in the country could hold land in England. The right of Jewish charities to hold land was clearly established by an act passed in 1846. The Jews were too few in number to be visited with special disabilities, but suffered from the general operation of the Tests Acts, which excluded them from political, civil, and municipal offices, from the bar, etc., and could be invoked to prevent them from voting at parliamentary elections. The Sephardic immigration is best known by the converts to Christianity whom it supplied, as Isaac Disraeli, and his son Lord Beaconsfield (who was baptized at the age of twelve), David Ricardo, the Lopes family, and others. Conversion to Christianity was encouraged by a statute of Anne (repealed in 1846), which compelled Jewish parents to make an allowance to their children who embraced the dominant faith. German Jews began to immigrate in large numbers after the accession of the house of Hanover. English statesmen soon perceived what important contributions the business ability of the Jews was capable of rendering to the wealth of the country in which they settled, but the enlightened appreciation of the governing class was long in making its way among the electors. In 1753 Mr. Pelham passed his Jewish Naturalization Act, which was repealed the next year owing to popular clamor, "No more Jews, no wooden shoes," becoming as influential a refrain as Lilliburlero. This premature emancipation supplied an argument which afterward assisted to retard the political liberation of the Jews. The Jews were excepted from the benefit of the Irish Naturalization Act in 1783; the exception was abolished in 1846; in that year also the obsolete statute De Judaismo, which prescribed a special dress for Jews, etc., was formally repealed. It had been disregarded ever since the return of the Jews under Cromwell. The Reform Act of 1832 gave the right of voting for members of parliament in all constituencies to Jews who possessed the property or other qualification required. Till 1828 only twelve Jewish brokers were permitted to carry on business in the city of London, and the patent was purchased for large sums when vacancies occurred. No Jew could open a shop in the city till 1832, because that permission was only accorded to freemen. Even baptized Jews were not admitted to the freedom of the city between 1785 and 1828. The first Jewish sheriff of London, Sir D. Salomons, was unable to take the oaths till a special act was passed by Lord Campbell in 1835, and, although he was followed two years later by another Jewish sheriff, Sir Moses Montefiore, it was not until ten years after his election as alderman that Lord Lyndhurst's act (1845) enabled him to perform the duties of that office. Among the names of Jews in England distinguished in science and literature are the mathematician Sylvester, the Sanscrit scholar Goldstücker, and the Orientalists Zedner and Deutsch. The first Jewish barrister (Sir F. Goldsmid) was called to the bar in 1833.

In the United States Jews are numerous, and enjoy full equality of rights and great material prosperity. A Jewish colony was founded by Judge Mordecai Noah, sheriff of New York, in 1825, at Grand Island in the Niagara river, but did not long endure. The Jews of the United States organize themselves in great friendly societies. Of these there are four principal orders:—The B'nai B'rith (Sons of the Covenant), which in 1878 had 22,814 members, had paid $1,000,000 in benefits, and retained $570,000 in hand; the Independent Order of Free Sons of Israel, with 8,604 members; the Kesher shel Barzel (Iron Link), with 10,000 members and $112,000; the Improved Order Free Sons of Israel, with 2,849 members. Jewish hospitals, orphan asylums, free schools, benevolent institutions, exist in very many cities. The union of American congregations comprises 118 congregations, and has for its objects (1) to promote religious instruction, and (2) to coöperate with similar associations throughout the world to relieve and elevate oppressed Jews. Many ways of interpreting Scripture prevail among the Jews in the United States. Some keep Sabbath on Sunday, others pray in English without any use of Hebrew; there is much laxity in observance, but all sects agree in building magnificent synagogues. In 1902 there were in the United States 570 congregations with 1,058,135 members, owning in their corporate capacity real estate worth $14,778,700 and other property worth $1,860,030, sending 12,886 children to their schools, and forming a population of about 1,250,000.

There are about 6,500,000 Jews in Europe. In Asia 200,000, in Africa 400,000, may be approximately correct totals, in America 1,300,000, in Australia 20,000. The total Jewish population of the world is about 11,724,000. It may be added that the vital statistics of the Jews differ a little from those of the nations with which they have been compared. The Jews have a somewhat greater average longevity, which is attributed to their abstinence, comparative freedom from phthisis, etc., and to their not often following employments which shorten life. Their dietary laws and ceremonial ablutions have an influence in preserving them from epidemics.

JEW'S HARP, or Jew's Trump, a small musical instrument, known for centuries all over Europe, and consisting of a metal frame with two branches, between which a slender tongue of steel, fastened at one end, and free at the other, is made to vibrate by twitching with the finger, while the frame is held between the teeth.

JEYPORE, or Jaipur, a native state in Rájputána, under the political superintendence of the Rájputána agency and the government of India. Area, 15,519 square miles. Pop. (1901), about 3,000,000.

Jeypore, or Jáipur, capital of the state of the same name, is situated on the Rájputána State railway and the Agra and Ajmere trunk road. It is the largest town and the chief commercial center of Rájputána, and in many respects the finest of modern Hindu cities. The city, which takes its name (Jáinagar, or Jáipur,) from the famous Mahárájá Siwái Jái Sinh II., by whom it was founded in 1728, stands on a small plain, surrounded on all sides, except the south, by rugged hills, the summits of which are at all important points crowned with forts. At the end of the ridge, overhanging the city on the northwest, is the chief defensive work, the *Nahargarh*, or "Tiger Fort," the rock face of which is so scarped as to be inaccessible on the south or city side. Jeypore is remarkable for the regularity and wideness of its streets and the architectural beauty of the mosques, temples, and private residences which adorn them. From east to west the town is a little over two miles in length, with a breadth of about one and a quarter miles. The main streets are paved, and the city is lighted by gas. The houses of the nobility and the citizens are in the suburbs, while the mahárájá's palace, with its pleasure grounds, occupies the center of the town. In Jeypore there are seven banking firms. Besides these, there are several minor houses. Exchange and banking form the greater portion of the business of the place. The city is well provided with hospitals, dispensaries, almshouses, and schools. One of the most interesting antiquities of the state is the Hindu observatory in the capital, erected by the founder of the city. The population (1901) was 159,030.

JEZREEL, the well-known capital of the Israelite monarchy under Ahab. Its site has never been lost, and the present village *Zer'în* retains the name radically unchanged. The modern village stands at the north extremity of a long ledge terminating in steep cliffs forming part of the chain of Mount Gilboa, east of the plain of Esdraelon.

JHÁLÁWÁR, a state in Rájputána, under the political superintendence of the Rájputána agency and the government of India, mainly consisting of two separate areas. The population is 343,601, of whom the majority are Hindus. The area of the whole state is 2,722 square miles.

JHANG, a British district in the lieutenant-governorship of the Punjab, India, with an area of 5,712 square miles. It forms the northern district of the Múltán division. Population (1900), 360,000.

Jhang, a municipal town in the above district. The sister town of Maghiána, containing the civil station for the district, lies three miles south of Jhang, and has a population of 10,525 persons. They form together a single municipality, and may be regarded as practically one town, situated about three and one-half miles to the west of the present bed of the Chenab. Population of the united towns, 19,649.

JHÁNSI, a British district in the lieutenant-governorship of the Northwestern Provinces, India. It forms the central district in the division of the same name.

The census taken over an area of 1,567 square miles, returned a population of 317,826, of whom (exclusive of non-Asiatics) 167,519 were males and 150,216 females. As regards religion, 305,151 were Hindus, while only 12,417 were Mahometans.

JHANSI, a city and fort in Gwalior state, Northwestern Provinces, India. The estimated population (1901) was 55,288.

JHELUM, or Jhílam, a district in the lieutenant-governorship of the Punjab, India, forms the southeastern portion of a rugged Himálayan spur, extending between the Indus and Jhelum to the borders of the Sind Ságar Doáb. Its scenery is very picturesque, although not of so wild a character as the mountain region of Ráwal Pindí to the north, and is lighted up in places by smiling patches of cultivated valley.

Jhelum, the headquarters of the above district, situated on the north bank of the Jhelum river. Population, 6,000.

JHIND, or Jind, a native state in the Punjab, India, consisting of three or four isolated tracts to the east of the Sutlej. The area is 1,259 square miles, and the estimated population (1901), 290,000.

JIDDAH, or Juddah, also written Jeddah, Djiddah, or Djeddah, a town of Arabia, on the eastern coast of the Red Sea, is of importance mainly as the landing-place of the pilgrims to Mecca. Its distance from the city is estimated at forty-four or forty-six miles.

JILOLO, Gilolo, or Djilolo (properly Jailolo or Djailolo, and in the native tongue *Halmahera* or *Halemahera*, *i.e.*, the mother or great land), is one of the larger islands of the East India archipelago, forming part administratively of the Dutch residency of Ternate. The equator cuts across the southern peninsula, the most northerly point of the island lying in 2° 13′ north latitude, and the southern extremity in 0° 52′ south. A large proportion of Jilolo is practically *terra incognita*, though information has somewhat accumulated since Wallace complained, in 1856, of the smallness of our knowledge in regard to it. The area is stated at 6,410 square miles; the extreme irregularity of the outline, however, renders the estimate a peculiarly precarious one.

JIMENES, or Ximenes, de Cisneros, Francisco, cardinal and statesman, was born in 1436 at Torrelaguna in Castile, of good but poor family. He studied at Alcala de Henares and afterward at Salamanca; and in 1459, having entered holy orders, he went to Rome. Returning to Spain in 1465, he brought with him an "expective" letter from the pope, in virtue of which he took possession of the archpriestship of Uzeda in the diocese of Toledo in 1473. Carillo, archbishop of Toledo, opposed him, and on his obstinate refusal to give way threw him into prison. For six years Jimenes held out, and at length in 1480 Carillo restored him to his benefice. This Jimenes exchanged almost at once for a chaplaincy at Siguenza, under Cardinal Mendoza, bishop of Siguenza, who shortly appointed him vicar-general of the diocese. Throwing up all his benefices, and changing his baptismal name Gonzales for that of Francisco, he entered the Franciscan monastery of San Juan de los Reyes, recently founded by Ferdinand and Isabella at Toledo. Not content with the ordinary severities of the novitiate, he added voluntary austerities. He slept on the bare ground, wore a hair-shirt, doubled his fasts, and scourged himself with much fervor; indeed throughout his whole life, even when at the acme of his greatness, his private life was most rigorously ascetic. The report of his sanctity brought crowds to confess to him; but from them he retired to the lonely monastery of Our Lady of Castañar; and he built with his own hands a rude hut in the neighboring woods, in which he lived at times as an anchorite. He was afterward guardian of a monastery at Salzeda. Meanwhile Mendoza (now archbishop of Toledo) had not forgotten him; and in 1492 he recommended him to Isabella as her confessor. The post was politically important, for Isabella submitted to the judgment of her father-confessor not only her private affairs but also matters of state. Jimenes' severe sanctity soon won him considerable influence over Isabella; and thus it was he first emerged into political life. In 1494 the queen's confessor was appointed provincial of the order of St. Francis, and at once set about reducing the laxity of the *Conventual* to the strictness of the *Observantine* Franciscans. As was to be expected, intense opposition was offered, and continued even after Jimenes became archbishop of Toledo. The general of the order himself came from Rome to interfere with the archbishop's measures of reform, but the stern inflexibility of Jimenes, backed by the influence of the queen, met and subdued every obstacle. Cardinal Mendoza had died in 1495, and Isabella had secretly procured a papal bull nominating her confessor to his diocese of Toledo, the richest and most powerful in Spain, second perhaps to no other dignity of the Roman church save the papacy. Long and sincerely Jimenes strove to evade the honor; but his resistance was after six months overcome by a second bull ordering him to accept consecration. With the primacy of Spain was associated the lofty dignity of high chancellor of Castile.

In 1499 Jimenes accompanied the court to Granada, and there joined the mild and pious Archbishop Talavera in his efforts to convert the Moors. Talavera had begun with gentle measures, but Jimenes preferred to proceed by haranguing the *fakihs*, or doctors of religion, and loading them with gifts. Outwardly the latter method was successful; in two months the converts were so numerous that they had to be baptized by aspersion. The indignation of the unconverted Moors swelled into open revolt. Jimenes was besieged in his house, and the utmost difficulty was found in quieting the city. Baptism or exile was offered to the Moors as a punishment for rebellion. The majority accepted baptism; and Isabella, who had been momentarily annoyed at her archbishop's imprudence, was satisfied that he had done good service to Christianity.

On November 26, 1504, Isabella died. Ferdinand at once resigned the title of king of Castile in favor of his daughter Joan and her husband the archduke Philip, assuming instead that of regent. Philip was keenly jealous of Ferdinand's pretensions to the regency; and it required all the tact of Jimenes to bring about a friendly interview between the princes. Ferdinand finally retired from Castile; and, though Jimenes remained, his political weight was less than before. The sudden death of Philip in September, 1506, quite overset the already tottering intellect of his wife; his son and heir Charles was still a child; and Ferdinand was at Naples. The nobles of Castile, mutually jealous, agreed to intrust affairs to the archbishop of Toledo, who, moved more by patriotic regard of his country's welfare than by special friendship for Ferdinand, strove to establish the final influence of that king in Castile. Ferdinand did not return till August, 1507; and with him he brought the cardinal's hat for Jimenes. Shortly afterward the new cardinal of Spain was appointed grand inquisitor-general for Castile and Leon. (See INQUISITION.)

The next great event in the cardinal's life was the expedition against the Moorish city of Oran in the north of Africa, in which his religious zeal was supported by the prospect of the political and material gain that would accrue to Spain from the possession of such a station. A preliminary expedition, equipped, like the following, at the expense of Jimenes, captured the port of Mers-el-Kebir in 1506; and in 1509 a strong force, accompanied by the cardinal in person (now in his seventy-second year), set sail for Africa, and in one day the wealthy city was taken by storm. Though the army remained to make fresh conquests, Jimenes returned to Spain, and occupied himself with the administration of his diocese, and in endeavoring to recover from the regent the expenses of his Oran expedition. On January 23, 1516, Ferdinand died, leaving Jimenes as regent of Castile for Charles (afterward Charles V.), then a youth of sixteen in the Netherlands. Though Jimenes at once took firm hold of the reins of government, and ruled in a determined and even autocratic manner, the haughty and turbulent Castilian nobility and the jealous intriguing Flemish councilors of Charles combined to render his position peculiarly difficult; while the evils consequent upon the unlimited demands of Charles for money threw much undeserved odium upon the regent. In violation of the laws, Jimenes acceded to Charles' desire to be proclaimed king; he secured the person of Charles' younger brother Ferdinand; he fixed the seat of the cortes at Madrid; and he established a standing army by drilling the citizens of the great towns. Immediately on Ferdinand's death, Adrian, dean of Louvain, afterward pope, produced a commission from Charles appointing him regent. Jimenes admitted him to a nominal equality, but took care that neither he nor the subsequent commissioners of Charles ever had any real share of the power. In September, 1517, Charles landed in the province of Asturias, and Jimenes hastened to meet him. On the way, however, he fell ill, not without a suspicion of poison. While thus feeble, he received a letter from Charles coldly thanking him for his services, and giving him leave to retire to his diocese. A few hours after this virtual dismissal, which some, however, say the cardinal never saw, Francisco Jimenes died at Roa, November 8, 1517.

JITOMIR. See ZHITOMIR.

JOACHIM (*c.* 1145–1202), abbot of Floris, has a place of considerable prominence in the category of those mystics who, like St. Hildegard or the abbess Elizabeth, on behalf of a sounder morality protested in prophetic denunciation against the many and gross abuses connected with the ecclesiasticism which prevailed in Europe toward the close of the twelfth century.

JOACHIMSTHAL, a mining town of Bohemia, in the circle of Eger, is favorably situated in a valley on the southern slopes of the Erzgebirge, about ten miles north of Carlsbad, and three miles from the Saxon frontier, at an elevation of 2,000 feet above the level of the sea. Population about 8,000.

JOAN, the name given to a female pope, now regarded as a fictitious personage, who under the title of John VII. or VIII. was said, according to the most general accounts, to have occupied the papal chair between the pontificate of Leo IV. and Benedict III., although various other dates are given. Tradition represents her as of English descent, but born in Ingelheim or Mainz. By some her original name is given as Gilberta, by others as Agnes. She was credited with having fallen in love with a young Benedictine monk, and with having on that account assumed the male monastic habit and lived for some time in the monastery of Fulda. Her lover, it is affirmed, died while they were pursuing their studies together at Athens, and after his death she went to Rome, where, according to the most approved version of the story, she became a very successful professor. So high indeed became her reputation for piety and learning that the cardinals with one consent elected the supposed young monk the successor of Pope Leo IV. In this position she comported herself so as entirely to justify their choice until the catastrophe of giving birth to a male child during a procession to the Lateran palace suddenly and irrevocably blasted her reputation. She is said either to have died in childbirth or to have been stoned to death.

JOAN of Arc, or more properly Joanneta Darc, afterward known in France as Jeanne d'Arc, the Maid of Orleans, was born about 1411, the daughter of Jacques Darc, peasant proprietor of Domremy, a small village partly in Champagne and partly in Lorraine, and of his wife Isabeau de Vouthon, who from having made a pilgrimage to Rome had received the usual surname of Romée. Joan never learned to read or write, and received her sole religious instruction from her mother, who taught her to recite the Pater Noster, Ave Maria, and Credo. In her childhood she was noted for her abounding physical energy; but her vivacity, so far from being tainted by any coarse or unfeminine trait, was the direct outcome of intense mental activity and an abnormally sensitive nervous temperament. Toward her parents her conduct was uniformly exemplary, and the charm of her unselfish kindness made her the special favorite of many in the village. In all household work she was specially proficient, her skill in the use of the needle not being excelled by that of any matron even of Rouen. As she grew to womanhood she became inclined to silence, and spent much of her time in solitude and prayer.

At this time, through the alliance and support of Philip of Burgundy, the English had extended their conquest over the whole of France north of the Loire as well as Guienne; and, while the infant Henry VI. of England had in 1422 been proclaimed king of France at his father's grave at St. Denis, Charles the dauphin, devoted only to present ease and pleasure, was almost passively contemplating the slow dismemberment of his kingdom by internal confusion and misery, and by the progressive encroachments of the English rule. The fact that the hard straits to which the kingdom was reduced were greatly owing to the conduct of Isabella, the dauphin's mother, who disinherited her son in favor of Henry V. of England, the husband of her daughter Catherine, supplied an opportunity for the fulfillment of the ancient prophecy of the enchanter Merlin, that the calamities which should fall upon France through the depravity of a woman would be removed by the instrumentality of a chaste virgin. To the imagination of the time there was, moreover, nothing strange in such a mode of deliverance, for it was no uncommon occurrence for damsels to accompany their lovers to the wars, and, disguised as pages, to share to some extent in their dangers and adventures. In the country of Joan the tradition was current that this virgin should come out of the forest of Domremy, where Joan was accustomed in her childhood to tend her father's sheep. How it therefore became fixed in her mind that she was the destined deliverer of her country there is little difficulty in understanding.

At last, when in 1428 Orleans, the key to the south of France, was invested by the English under the earl of Salisbury, the demand become so peremptory and urgent as to overcome all pretexts for delay on account of previous discouragements and rebuffs. Notwithstanding the strong remonstrances of her parents, who viewed her resolve with poignant grief and dismay, she now renewed with increased determination her efforts to win from Robert de Baudricourt, governor of Vaucouleurs, an introduction to the dauphin Charles. In all her subsequent acts she professed to be guided by the voices of the saints, who set before her the twofold task of relieving Orleans and crowning the young dauphin at Rheims. By persistent importunity, the effect of which was increased by the simplicity of her demeanor and her calm assurance of success, she at last prevailed on the governor to grant her request; and in February, 1429, accompanied by two knights, she set out on her perilous journey to the court of the dauphin at Chinon. At first Charles refused to see her, but the rising tide of popular feeling in her favor induced his advisers to persuade him after three days to grant her an interview. Of the divinity of her commission she is said to have persuaded him by discovering him though disguised in the crowd of his courtiers, and by assuring him regarding his secret doubts as to his legitimacy. Accordingly, after a commission of doctors had reported that they had found in her nothing of evil or contrary to the Catholic faith, and a council of matrons had reported on her chastity and virginity, she was permitted to set forth with an army of 4,000 or 5,000 men designed for the relief of Orleans. At the head of the army she rode clothed in a coat of mail, armed with an ancient sword which she had divined to be hidden near the altar of St. Catherine de Fierbois, and carrying a white standard of her own design embroidered with lilies and having on the one side the image of God seated on the clouds and holding the world in his hand, and on the other a representation of the annunciation. Joan was of medium height, stoutly built, but finely proportioned; and her frame was capable of enduring great fatigue. Notwithstanding subsequent traditions, she does not appear to have been strikingly handsome. Conventional beauty of the highest type could not be expected in one accustomed to her mode of life, but the most authentic testimonies represent her as less comely than many in her own station. Nominally she had been intrusted with the command of the army, but in reality it was under the direction of experienced generals; and it cannot be pretended that the victories accomplished in consequence of her coöperation were the result of brilliant military genius. Indeed, the blind obstinacy with which in the face of overwhelming odds she refused to acknowledge defeat place it beyond doubt that she was unable to estimate the elements of success in battle, and was actuated throughout by a fatalistic persuasion that victory was inevitable if she persevered unflinchingly in her efforts to obtain it. At the same time she possessed a shrewd and penetrating judgment both as to men and things, and the manner in which she conducted herself amid the varied difficulties of her career indicated extraordinary force of character and high and noble prudence. What, however, she chiefly supplied to the French cause was concentrated energy and resolution. Above all, she inspired the soldiery with a fanatical enthusiasm armed with the sanctions and ennobled by the influences of religion; and she overawed the enemy by the superstitious fear that she was in league with supernatural powers.

By a remarkable stroke of good luck Joan succeeded in entering Orleans on April 29, 1429, and through the vigorous and unremitting attacks of the French tro

English gradually became so discouraged that on May 8th they raised the siege. By the capture of Jargeau and Beaugency, followed by the great victory of Patay, where Talbot was taken prisoner, the English were driven beyond the Loire. With some difficulty the king was then persuaded to set out toward Rheims, which he entered with an army of 12,000 men on July 16th, Troyes having on the way been taken by assault at the sole instigation of the Maid. On the following day, holding the sacred banner, she stood next to Charles at his coronation in the cathedral. After an endeavor to detach Burgundy from the English cause, the king at last agreed to attempt the capture of Paris, but on account of the disastrous result of an attack made on September 8th, in which Joan was wounded, he resolved, notwithstanding her passionate remonstrance, to withdraw from the city, and disbanded his troops. Joan went into Normandy to assist the duke of Alençon, but in December returned to the court, and on the 29th she and her family were ennobled with the surname of du Lis. Unconsoled by such honors, she rode away from the court in March, to assist in the defense of Compiègne against the duke of Burgundy; and on May 24th she led an unsuccessful sortie against the besiegers, when on account of her determination to fight to the last she was surrounded and taken prisoner. Charles, partly perhaps on account of his natural indolence, partly on account of the intrigues at the court, made no effort to effect her ransom, and never showed any sign of interest in her fate. Probably he found her so difficult to manage and control that he as well as his generals regarded her presence with the army as more embarrassing than helpful; and doubtless her capture dissipated the halo of supernatural power that had surrounded her. By means of negotiations instigated and prosecuted with great perseverance by the university of Paris and the Inquisition, and through the persistent scheming of Pierre Cauchon, the ejected bishop of Beauvais, she was sold in November by Luxembourg and Burgundy to the English, who on January 3, 1431, at the instance of the university of Paris, delivered her over to the Inquisition for trial. After a public examination, begun on January 9th and lasting six days, and another conducted in the prison, she was, on March 20th, publicly accused as a heretic and sorcerer, and, being in the end found guilty, she made her submission at the scaffold on May 24th, and received pardon. She was still, however, the prisoner of the English, and, having been induced by those who had her in charge to resume her male clothes, she was on this account judged to have relapsed, was sentenced to death, and burned at the stake on the streets of Rouen, May 30, 1431. The sentence was revoked by the pope on July 7, 1456, and since then it has been the custom of Catholic writers to uphold the reality of her divine inspiration.

JOB. The book of Job, *Iyyob*, the most splendid creation of the Hebrew poetry, is so called from the name of a man whose history and afflictions and sayings form the theme of it.

As it now lies before us it consists of five parts. 1. The prologue, in prose, ch. i.–ii., describes in rapid and dramatic steps the history of this man, his piety and prosperity and greatness corresponding to his godliness; then how his life is drawn in under the operation of the trying, sifting providence of God, through the suspicion suggested by Satan, the minister of this aspect of God's providence, that his godliness is but selfish, and only the natural return for the unexampled prosperity bestowed upon him, and with the insinuation that if stripped of his prosperity he will renounce God to His face. These suspicions bring down two severe calamities on Job, one depriving him of all external blessings, children and possessions alike, and the other throwing the man himself under a loathsome and painful malady. In spite of these afflictions Job retains his integrity, and ascribes no wrong to God. Then the advent of Job's three friends is described, Eliphaz the Temanite, Bildad the Shuhite, and Zophar the Naamathite, who, having heard of Job's calamities, come to condole with him. 2. The body of the book, in poetry, ch. iii.–xxxi., contains a series of speeches, in which the problem of Job's afflictions and the relation of external evil to the righteousness of God and the conduct of men are brilliantly discussed. This part is divided into three cycles, each containing four speeches, one by Job and one by each of the friends, although in the last cycle the third speaker, Zophar, fails to answer, and Job, having driven his opponents from the field, carries his reply through a series of discourses, in which he dwells in pathetic words upon his early prosperity, contrasting with it his present misery and humiliation, and ends with a solemn repudiation of all the offenses that had been insinuated or might be suggested against him, and a challenge to God to appear and put His hand to the charge which he had against him and for which He afflicted him. 3. A youthful bystander named Elihu, the representative of a younger generation, who had been a silent observer of the debate, intervenes, and expresses his dissatisfaction with the manner in which Job and his friends had conducted the cause, and offers what is, in some respects, a new solution of the question. 4. In answer to Job's repeated demands that God would appear and solve the riddle of his life, the Lord answers Job out of the whirlwind. The Divine speaker does not condescend to refer to Job's individual problem, but in a series of ironical interrogations asks him, as he thinks himself capable of fathoming all things, to expound the mysteries of the origin and subsistence of the world, the phenomena of the atmosphere, the instincts of the creatures that inhabit the desert, and, as he judges God's conduct of the world amiss, invites him to seize the reins himself and gird him with the Divine thunder and quell the rebellious forces of evil in the universe. Job is humbled and abashed, and lays his hand upon his mouth, and repents his hasty words in dust and ashes. No solution of his problem is vouchsafed; but God Himself effects that which neither the man's own thoughts of God nor the representations of his friends could accomplish: he heard of Him with the hearing of the ear without effect, but now his eye saw Him. This is the profoundest religious deep in the book. 5. The epilogue, also in prose, describes Job's restoration to a prosperity double that of his former estate, his family felicity, and long life.

With the exception of the episode of Elihu, the connection of which with the original form of the poem may be doubtful, all these five parts are essential elements of the work as it came from the hand of the first author, although some parts of the second and fourth divisions may have been expanded by later writers. The idea of the composition is not to be derived from any single element of the book, as from the prologue, but from the teaching and movement of the whole piece. Job is unquestionably the hero of the work, and in the ideas which he expresses and the history which he passes through combined, we may assume that we find the author himself speaking and teaching. The discussion of the question of suffering between Job and his friends occupies two-thirds of the book, or, if the space occupied by Elihu be not considered, nearly three-fourths, and in the direction which the author causes this discussion to take we may see revealed the main didactic purpose of the book. When the three friends, the representatives of former theories of providence, are reduced to silence and driven off the ground by Job, we may be certain that it was the author's purpose to discredit the ideas which they represent. Job himself offers no positive contribution to the doctrine of evil; his position is negative, and merely antagonistic to that of the friends. But this negative position victoriously maintained by him has the effect of clearing the ground, and the author himself supplies in the prologue the positive truth, when he communicates the real explanation of his hero's calamities, and teaches that they were a trial of his righteousness. It was, therefore, the author's purpose in his work to widen men's views of the providence of God and set before them a new view of suffering. This may be considered the first great object of the book. This purpose, however, was in all probability no mere theoretical one, but subordinate to some wider practical design. No Hebrew writer is merely a poet or a thinker. He is always a teacher. He has men before him in their relations to God. And it is not usually men in their individual relations, but as members of the family of Israel, the people of God. It is consequently scarcely to be doubted that the book has a national scope. The author considered his new truth regarding the meaning of affliction as of national interest, and to be the truth needful for the heart of his people in their circumstances. But the teaching of the book is only half its contents. It contains also a history—deep and inexplicable affliction, a great moral struggle, and a victory. The author meant his new truth to inspire new conduct, new faith and new hopes. In Job's sufferings, undeserved and inexplicable to him, yet capable of an explanation most consistent with the goodness and faithfulness of God, and casting honor upon his faithful servants; in his despair bordering on unbelief, at last overcome; and in the happy issue of his afflictions—in all this Israel may see itself, and from the sight take courage, and forecast its own history. Job, however, is not to be considered Israel, the righteous servant of the Lord, under a feigned name; he is no mere parable (though such a view is found as early as the Talmud); he and his history have both elements of reality in them. It is these elements of reality common to him with Israel in affliction, common even to him with humanity as a whole, confined within the straitened limits set by its own ignorance, wounded to death by the mysterious sorrows of life, tortured by the uncertainty whether its cry finds an entrance into God's ear, alarmed and paralyzed by the irreconcilable discrepancies which it seems to discover between its necessary thoughts of Him and its experience of Him in His providence, and faint with longing that it might come into His place, and behold Him, not girt with His majesty, but in human form, as one looketh upon his fellow—it is these elements of truth that make the history of Job instructive to Israel in the times of affliction when it was set before them, and to men in all ages. It would probably be a mistake, however, to imagine that the author consciously stepped outside the limits of his nation, and assumed a human position antagonistic to it. The chords he touches vibrate through all humanity; but this is because Israel is the kernel of humanity, and because from Israel's heart the deepest music of mankind is heard, whether of pathos or of joy.

The book of Job is not literal history, though it reposes on an historical tradition. To this tradition belong probably the name of Job and his country, and the names of his three friends, and perhaps also many other details impossible to specify particularly. The view that the book is entirely a literary creation with no basis in historical tradition is as old as the Talmud, in which a rabbi is cited who says, Job was not, and was not created, but is an allegory. And this view has still supporters, *e.g.*, Hengstenberg. Pure poetical creations on so extensive a scale are not probable in the East and at so early an age. The author of the book is wholly unknown. No literature has so many great anonymous works as that of Israel. The religious life of this people was at certain periods very intense, and at those times the spiritual energy of the nation expressed itself almost impersonally, through men who forgot themselves and were speedily forgotten in name by others.

JOB'S TEARS. The seeds, or properly fruits of Job's tears, *Coix lachryma*, Willd., a species of grass, are contained singly in a stony involucre or bract, which does not open until the inclosed seed germinates. The young involucre surrounds the female flower and the stalk supporting the spike of male flowers, and when ripe has the appearance of bluish-white porcelain. Being shaped somewhat like a large drop of fluid, the form has suggested the name Job's tears, under which the plant has been long known. The seeds are esculent, but the involucres are the part chiefly used, for making necklaces and other ornaments. The plant is a native of the East Indies, and was cultivated by Gerard as a tender annual.

JODHPUR, also called MÁRWÁR, a native state in Rájputána, India. The general aspect of the country is that of a sandy plain, divided into two unequal parts by the river Lúni, and dotted with bold and picturesque conical hills, attaining in places an elevation rising to 3,000 feet. The river Lúni is the principal feature in the physical aspects of Jodhpur. The population in 1901 was about 2,500,000.

JODHPUR, the capital of the above state, was built by Ráo Jodha in 1549, and from that time has been the seat of government of the principality. Pop. (1901), 60,437.

JOEL. The second book among the minor prophets is entitled *The word of Jehovah that came to Joel the son of Pethuel*, or, as the Septuagint, Latin, Syriac, and other versions read, *Bethuel*. Nothing is recorded as to the date or occasion of the prophecy, which presents several peculiarities that aggravate the difficulty always felt in interpreting an ancient book when the historical situation of the author is obscure. Most Hebrew prophecies contain pointed references to the foreign politics and social relations of the nation at the time. In the book of Joel there are only scanty allusions to Phœnicians, Philistines, Egypt, and Edom, couched in terms applicable to very different ages, while the prophet's own people are exhorted to repentance without specific reference to any of those national sins of which other prophets speak. The occasion of the prophecy, described with great force of rhetoric, is no known historical event, but a plague of locusts, perhaps repeated in successive seasons; and even here there are features in the description which have led many expositors to seek an allegorical interpretation. The most remarkable part of the book is the eschatological picture with which it closes; and the way in which the plague of locusts appears to be taken as foreshadowing the final judgment—the great day or assize of Jehovah, in which Israel's enemies are destroyed—is so unique as greatly to complicate the exegetical problem. It is not therefore surprising that the most various views are still held as to the date and meaning of the book. Allegorists and literalists still contend over the first and still more over the second chapter, and, while the largest number of recent interpreters accept Credner's view that the prophecy was written in the reign of Joash of Judah, a rising and powerful school of critics follow the view suggested by Vatke, and reckon Joel among the post-exile prophets.

JOHN, the Apostle ("Jehovah hath been gracious"), was the son of Zebedee, a Galilæan fisherman, and Salome. It is probable that he was born at Bethsaida, where along with his brother James he followed his father's occupation. The family appear to have been in easy circumstances; at least we find that Zebedee employed hired servants, and Salome was among the number of those women who contributed to the maintenance of Jesus; he himself was perhaps related to Annas the high priest. It seems to have been when attending as a disciple the preaching of John the Baptist at Bethany beyond Jordan that he first became personally acquainted with our Lord; his "call" to follow Him occurred simultaneously with that addressed to his brother and to Andrew and Peter. He speedily took his place among the twelve apostles, sharing with James the title of Boanerges ("sons of thunder"), became a member of that inner circle to which, in addition to his brother, Peter alone belonged, and ultimately was recognized as the disciple *par excellence* whom Jesus loved, a distinction usually attributed to his amiability and gentleness of character, but much less probably due to any special sweetness of temperament than to a quickness and depth of insight which enabled him to enter more fully than his companions into the larger and wider-reaching views of his Master. After the departure of Jesus John remained at Jerusalem, where he was one of the most prominent among those who bore personal testimony to the fact of the resurrection; we find him for a short time in Samaria after the martyrdom of Stephen, but on Paul's second visit to the Jewish capital John was again there. His subsequent movements are obscure, but he can hardly have been in Jerusalem at the time of Paul's last visit there in 58 A. D. At this point the history of the apostle is taken up by ecclesiastical tradition. Polycrates, bishop of Ephesus, 196 A.D. (in Euseb., *H. E.* iii. 31; v. 24), attests that John "who lay on the bosom of the Lord" died at Ephesus. Irenæus in various passages of his works confirms this tradition. He says that John lived up to the time of Trajan, and published his Gospel in Ephesus. Irenæus also identifies the apostle with John the disciple of the Lord, who wrote the Apocalypse under Domitian, whom his teacher Polycarp had known personally, and of whom Polycarp had much to tell. These traditions are accepted and enlarged by later authors, Tertullian adding that John was banished to Patmos after he had miraculously survived the punishment of immersion in boiling oil.

JOHN, EPISTLES OF. Of the three Epistles which are ascribed to the apostle John, the First is by far the most important, both from the space which it occupies in the canon and from the weightiness of its teaching.

FIRST EPISTLE. Some exception has been taken to the title "epistle" as applied to this document, seeing that it bears the name neither of sender nor of recipient, and carries with it no definiteness of message to a special correspondent. But, though it may be admitted that with regard to its literary form it would more properly be described as a homily or discourse, the frequently recurring terms "I wrote," "I have written," imply that the message was written, not orally delivered.

The external evidence for the genuineness of this epistle is weighty. The two epistles of St. John mentioned in the canon of Muratori are probably the Second and Third, but the absence of reference to the First in that particular connection implies its acknowledged canonicity; moreover, the same canon contains a citation of 1 John i. 1, 4. The early fragment called the letter to Diognetus has unmistakable allusions to the Johannine epistles. The Peshito contains the epistle, and there is an undoubted reference to it in the letter from the churches of Vienna and Lyons. All those authorities belong to the first two centuries. In the succeeding centuries the volume of evidence grows. Eusebius reckons the epistle among the *Homologoumena* or writings of acknowledged authority, and the testimony of Tertullian, Clemens Alexandrinus, Origen, and Cyprian, in addition to the evidence already adduced, indicates its reception in all the churches.

To those who accept the Fourth Gospel as John's, the strength of the internal evidence for the Johannine authorship of the epistle lies in the similarity of words, of teaching, and of style between the two writings. This similarity is so marked that it requires no argumentative proof. It is a similarity not only of diction, or of parallel expressions and peculiarities of style, but one which is penetrated by the more subtle correspondence of under-currents of thought and of implied knowledge. On the other hand, the very closeness of the connection between the epistles and the gospel has necessarily involved the former in the assaults of recent criticism upon the genuineness of the latter. Some critics, however, while admitting the similarity of style, contend that there are differences of doctrine between the gospel and epistle which preclude identity of authorship. The main points advanced in behalf of this statement are—the supposed differences in eschatological views, the application of the term "Paraclete" to the work of the Holy Spirit in the gospel and to the office of Christ alone in the epistle, the introduction into the epistle of terms which are not found in the gospel, and, lastly, the polemical and strongly anti-Docetic tone which is said to distinguish the epistle from the gospel. Such differences, however, are in part more apparent than real (they are certainly not contradictions), and in part may be naturally explained by the changed circumstances in which the two writings were composed and the different aims proposed in them.

The date of the epistle must remain in uncertainty; but it is generally viewed as later in composition than the gospel. "The phrases in the gospel," writes Professor Westcott, "have a definite historic connection; they belong to circumstances which explain them. The phrases in the epistle are in part generalizations and in part interpretations of the earlier language in view of Christ's completed work, and of the experience of the Christian church." The same writer assigns on good grounds to the gospel as well as to the epistle a date subsequent to the fall of Jerusalem.

The epistle was probably written at Ephesus, where the most ancient tradition places the closing scenes of St. John's life, and addressed to the church of Ephesus, or as an encyclical letter to the churches of Asia. In some Latin MSS., however, and in St. Augustine's *Quæst. Evang.*, ii. 39, the address *ad Parthos* is found. Bede adds testimony to the same effect. But such a destination of the epistle is unlikely in itself, receives no support from the Greek Church, and is opposed to ecclesiastical tradition. Hence the best criticism rejects the superscription. It is variously accounted for.

SECOND AND THIRD EPISTLES.—These are interesting as the only example of apostolic letters to private persons, except the epistle to Philemon, which have descended to us. Their genuineness is well attested, though with less decisive evidence than that of the First Epistle.

JOHN, GOSPEL OF. See GOSPELS.

JOHN THE BAPTIST, the last of the prophets and the "forerunner" of Christ, was born, according to rabbinical tradition, at Hebron, but, according to an ingenious modern interpretation, at Jutta, in the beginning of the second half of the year 749 A.U.C. His father **Zechariah** was a priest "of the course of Abia;" his mother Elizabeth was related to Mary, the mother of Jesus, whose senior John was by six months. The circumstances of his birth are related with much detail in Luke i., but those of his early years are summed up in the single expression at ver. 80 that he "grew, and waxed strong in spirit, and was in the deserts till the day of his shewing unto Israel." In his thirtieth year he began his public life in the "wilderness of Judæa," the wild district that lies between the Kidron and the Dead Sea, and particularly in the neighborhood of the Jordan, where multitudes were attracted by his eloquence. His appearance, costume, and habits of life were such as to recall to the minds of his hearers what they had read about the ancient prophets, and particularly about Elijah, who came to be regarded as his prototype. Nor was his preaching in substance different from theirs; his central doctrine was that the "kingdom of heaven" had come near, and preparation for its speedy arrival by an appropriate change of heart and life was the practical duty he urged. With regard to the nature of the baptism he administered, much uncertainty exists. Among those who resorted to this rite was John's kinsman, Jesus of Nazareth, whom he had foretold, and now acknowledged, as one mightier than himself, the latchet of whose shoes he was not worthy to unloose. The duration of John's ministry cannot be determined with certainty; it terminated in his imprisonment in the fortress of Machærus, to which he had been committed by Herod Antipas, whose incestuous marriage with Herodias the Baptist had sternly rebuked, and where he was beheaded under circumstances which are familiar to every reader of the Bible. The date of this event cannot with safety be placed later than the end of 782 A.U.C. For our knowledge of John the Baptist we are almost entirely dependent on the notices contained in the Gospel narratives, but a brief account of his career is also given by Josephus; some legends of an obviously fictitious character are contained in the apocryphal Gospels.

JOHN, the name of twenty-two popes.

JOHN I. (pope from 523 to 526) was a Tuscan by birth, and was consecrated pope on the death of Hormisdas. In 525 he was sent by Theodoric at the head of an embassy to Constantinople to obtain from the emperor Justin toleration for the Arians; but, whether designedly or not, he succeeded so imperfectly in his mission that Theodoric on his return, suspecting that he had acted only half-heartedly, threw him into prison, where he shortly afterward died, Felix IV. (or III.) succeeding him. He was enrolled among the martyrs, his day being May 27.

JOHN II. (pope from 532 to 535), surnamed, on account of his eloquence, Mercurius, was elevated to the papal chair on the death of Boniface II. During his pontificate a decree against simony was engraven on marble and placed before the altar of St. Peter's. He was succeeded by Agapetus I.

JOHN III. (pope from 560 to 573), successor to Pelagius, was descended from a noble Roman family. He is said to have been successful in preventing an invasion of Italy by the recall of the deposed exarch Narses, but the Lombards still continued their incursions, and, especially during the pontificate of his successor, Benedict I., inflicted great miseries on the province.

JOHN IV. (pope from 640 to 642) was a Dalmatian by birth, and succeeded Severinus after the papal chair had been vacant four months. His successor was Theodorus I.

JOHN V. (pope from 686 to 687) was a Syrian by birth, and on account of his knowledge of Greek had in 680 been named papal legate to the sixth œcumenical council at Constantinople. He was the successor of Benedict II., and after a pontificate of little more than a year, passed chiefly in bed, was followed by Conon.

JOHN VI. (pope from 701 to 705) was a native of Greece, and succeeded to the papal chair two months after the death of Sergius I. An attempt of the exarch, Theophylact, of Ravenna, to extort from him certain concessions to the Byzantine emperor Tiberius, was frustrated by the revolt of the Italian portion of the army with which he threatened Rome, who, but for the intervention of the pope, would have put their leader to death. Partly by persuasion and partly by means of a bribe, John also succeeded in inducing Gisulph, duke of Benevento, to withdraw from the territories of the church.

JOHN VII. (pope from 705 to 707), successor of John VI., was also of Greek nationality. He was followed by Sisinnius.

JOHN VIII. (pope from 872 to 882), successor of Adrian II., was a Roman by birth. His chief aim during his occupancy of the papal chair was to build up his temporal power by uniting the various discordant political elements of Italy into a theocracy under his own immediate control, and by subordinating the empire to the ecclesiastical authority of Rome. He presided at the council of Troyes, which promulgated a ban of excommunication against the supporters of Carloman—amongothers Adalbert, of Tuscany, Lambert, of Spoleto, and Formosus, bishop of Porto, who was afterward elevated to the papal chair. In 879 John returned to Italy accompanied by Duke Boso, of Provence, whom he adopted as his son, and made an unsuccessful attempt to get recognized as king of Italy. In the same year he was compelled to give a promise of sanction to the claims of Charles the Fat, who received from him the imperial crown in 881. Previous to this, in order to secure the aid of the Greek emperor against the Saracens, he had agreed to sanction the restoration of Photius to the see of Constantinople, and had withdrawn his consent on finding that he reaped from the concession no substantial benefit. Charles the Fat, partly from unwillingness, partly from natural inability, gave him also no effectual aid, and the last years of John VIII. were spent chiefly in hurling vain anathemas against his various political enemies. According to the authority of Fulda, he was murdered by one of his near relations. His successor was Martin II.

JOHN IX. (pope from 898 to 900) was of German birth, and belonged to the Benedictine order. He was succeeded by Benedict IV.

JOHN X. (pope from 914 to 928) was deacon at Bologna when he attracted the attention of the empress Theodora, through whose influence he was elevated first to that see and then to the archbishopric of Ravenna. In direct opposition to a decree of council, he was also at the instigation of Theodora promoted to the papal chair as the successor of Lando. His successor was Leo VI.

JOHN XI. (pope from 931 to 936) was born in 906, the son of Marozia and the reputed son of Sergius III. Through the influence of his mother he was chosen to succeed Stephen VII. at the early age of twenty-one. He was the mere exponent of the purposes of his mother, until her son Alberic succeeded in 933 in overthrowing their authority. The pope was kept a virtual prisoner in the Lateran, where he is said to have died in 936, in which year Leo VII. was consecrated his successor.

JOHN XII. (pope from 955 to 964) was the son of Alberic, whom he succeeded as patrician of Rome in 954, being then only sixteen years of age. His original name was Octavian, but when he assumed the papal tiara as successor to Agapetus II., he adopted the apostolic name of John, the first example, it is said, of the custom of altering the surname in connection with elevation to the papal chair.

JOHN XIII. (pope from 965 to 972) was descended from a noble Roman family, and at the time of his election as successor to Leo VIII. was bishop of Narni. Shortly after holding a council along with the emperor at Ravenna in 967, he gave the imperial crown to Otho II. at Rome in assurance of his succession to his father; and in 972 he also crowned Theophania as empress immediately before her marriage. On his death in the same year, he was followed by Benedict VI.

JOHN XIV. (pope from 984 to 985), successor to Benedict VII., was born at Pavia, and before his elevation to the papal chair was imperial chancellor of Otho II. Otho died shortly after his election, and, taking advantage of the opportunity, Boniface VII., on the strength of the popular feeling against the new pope, returned from Constantinople and placed John in prison, where he died either by starvation or poison.

JOHN XV. (pope from 985 to 996) is now generally recognized as the successor of Boniface VII., the pope of the same name who was said to have ruled for four months after the murder of Boniface being now omitted by the best authorities. John XV. was the son of Leo, a presbyter in Gallina Alba. At the time he mounted the papal chair Crescentius was patrician of Rome, but, although his influence was on this account very much hampered, the presence of the empress Theophania in Rome from 989 to 991 restrained also the ambition of Crescentius. On her departure the pope, whose venality and nepotism had made him very unpopular with the citizens, found it necessary to flee to Tuscany. The news of the approach of Otho III. made it possible for him soon afterward to return, but he died of fever before the arrival of Otho, who elevated his own kinsman Bruno to the papal dignity under the name of Gregory V.

JOHN XVI. (pope or antipope from 997 to 998) was a Calabrian Greek by birth, and a favorite of the empress Theophania, from whom he had received the bishopric of Placentia. His original name was Philagathus.

JOHN XVII., whose original name was Sicco, succeeded Silvester II. as pope in June, 1003, but died in less than five months afterward.

JOHN XVIII. (pope from 1003 to 1009) was, during his whole pontificate, the mere creature of the patrician John Crescentius, and ultimately he abdicated and retired to a monastery, where he died shortly afterward. His successor was Sergius IV.

JOHN XIX. (pope from 1024 to 1033) succeeded his brother Benedict VIII., both being members of the powerful house of Tusculum. On the death of the emperor Henry II. in 1024 he gave his support to Conrad II., who, along with his consort, was crowned with great pomp at St. Peter's in Easter of 1027. In 1033 a conspiracy of the nobles compelled the pope to flee from Rome, but he was restored by Conrad, and died the same year in the full possession of his dignities. A successor was found for him in his nephew Benedict IX., a boy of only twelve years of age.

JOHN XXI. (pope from 1276 to 1277), successor to Adrian V., should, according to the order observed above, be named John XX., but there is an error in the reckoning through the insertion of an anti-pope before John XV. or some time after John XIX. At the time of his elevation to the papal chair he was cardinal-bishop of Tusculum, and he had previously been archbishop of Braga. He was a Portuguese by birth, and his original name was Pedro Juliani. The son of a physician, he had studied with distinction at Paris, was the author of several medical and scholastic treatises, and is mentioned by some chroniclers as a magician. His small affection for the monks, his unecclesiastical tone and habits, free and unaffected intercourse with every class of men, and proficiency in secular science, awakened against him the jealousy and distrust of the clergy, but probably his comprehensive and liberal policy would have shed exceptional luster on the church had not his life been brought to a premature close through the fall of the roof which he had planned for one of his rooms in the palace of Viterbo. His successor was Nicholas III.

JOHN XXII. (pope from 1316 to 1334) was born at Cahors about 1244. His original name was Jacques d'Euse, and his father is said to have been a cobbler. Tradition affirms that the son learned the same employment, but afterward he was taken charge of by his uncle, a successful merchant, who rose to be chancellor of Robert of Sicily. Through the instruction of a Franciscan friar, Jacques d'Euse acquired, besides an acquaintance with theology, a mastery of canon and civil law which afterward stood him in good stead; but, although he was also versed in all the details of statesmanship, his learning was saturated with scholasticism, and his political ideas were narrowed by a mean and paltry ambition, the principal element of which was a miserly love of gold.

JOHN XXIII. (pope from 1410 to 1415) was born in Naples about 1360. He was of noble descent, his original name being Balthasar Cossa. In his youth he had, along with his brothers, served as a corsair, and at the university of Bologna, which he afterward entered, he led a loose and intemperate life. After occupying the office of archdeacon of Bologna, he became chamberlain of Boniface IX., and in that office greatly enriched both himself and the pope by his unscrupulous traffic in indulgences. In recognition of the high value of his services he was in 1402 created by Boniface a cardinal, and shortly afterward he was appointed papal legate to Bologna, which he succeeded in wresting from the Visconti. The scandalous and cruel excesses in which he indulged when governor of the city caused Gregory XII. to pass against him a sentence of excommunication, but he was restored to his full dignities by Alexander V. The death of this pope, which took place suddenly at Bologna in 1410, was generally believed to have been contrived by the governor, but the cardinals were unanimous in electing him his successor, other two popes, Benedict XIII. and Gregory XII., the predecessors of Alexander, being still alive. In 1413 Ladislaus, advancing on Rome, compelled the pope to flee to Florence and thence to Bologna. In his extremity John implored the protection and help of the emperor Sigismund, who condescended to acknowledge him to the extent at least of requiring him to summon a council at Constance by which his claims and that of the other two rival popes should be decided. John opened the council in person in 1414, but, after consenting to abdicate preliminary to the council deciding on his claims, he made his escape in disguise to Freiburg, where he obtained the protection of the duke of Austria. On his refusal to return he was solemnly deposed by the council as guilty of a long list of heinous crimes. The duke of Austria then surrendered him to the emperor, and after he had acknowledged the justice of his sentence he was confined in the castle of Heidelberg. At the end of four years' imprisonment he obtained his freedom, in all probability through a bribe, and, having made his submission to his successor Martin V., he was appointed by him cardinal-bishop of Frascati, and dean of the college of cardinals, but he died a few months afterward.

JOHN I. (925-976), emperor of Constantinople, surnamed on account of his short stature *Zimisces*, was descended from a distinguished family of Cappadocia, and was the nephew of Nicephorus Phocas, whom he aided to obtain the throne, and with whom he afterward shared the military command of the empire. Being, however, deprived of this dignity through the intrigues of the emperor's brother Leo, he entered into a conspiracy to assassinate Nicephorus, which was put into execution on December 10, 969. The reign of Zimisces is chiefly remarkable for his victories over the Russians, and the conquest of Bulgaria. Afterward he achieved many brilliant exploits against the Saracens, but on his way home he died in January, 976.

JOHN II. (1088-1143), Comnenus, surnamed *Kalojoannes* (John the Good), was the eldest son of the emperor Alexius, whom he succeeded on the throne in 1118. On account of his mild and just reign he has been called the Byzantine Marcus Aurelius, but he displayed little vigor in the internal administration of his kingdom or in extirpating the governmental corruptions and abuses he had inherited. Nor did his various successes against the Hungarians, Servians, and Turks, though they won him the high admiration of his soldiers, add much to the stability of his kingdom. He was accidentally killed during a wild-boar hunt on Mount Taurus, April 8, 1143.

JOHN III. (1193-1254), Vatatzes, surnamed *Ducas*, emperor of Nicæa, earned for himself such distinction as a soldier that in 1222 he was chosen to succeed Theodore I. His successes in war, which earned for him great renown, were rendered of little advantage to him through the intrigues of other sovereigns, but he administered the internal affairs of his dominions with much enlightenment and skill, and devoted great attention to agriculture.

JOHN IV., Lascaris, emperor of Nicæa, son of Theodore II., was born about 1250. His father dying in 1258, Michael Palæologus conspired shortly after to make himself regent, and in 1261 dethroned the boy monarch and put out his eyes. John died in prison.

JOHN V. (1327-1411), Cantacuzenus. See CANTACUZENUS.

JOHN VI. (1332-1391), Palæologus, emperor of Constantinople, was the son of Andronicus III., whom he succeeded in 1341. From 1342 John Cantacuzenus shared the throne with him, till on the abdication of his colleague, who had been virtually the sovereign, he became sole emperor in 1344. His reign was marked by the gradual dissolution of the imperial power through the rebellion of his son Andronicus and the encroachments of the Ottomans, to whom in 1381 John acknowledged himself tributary.

JOHN VII. (1390-1448), Palæologus, emperor of Constantinople, son of Manuel II., in 1425 succeeded to the semblance of dominion and the wreck of the empire. To secure the favor of the Latins he consented to the union of the Greek and Roman Churches, which was ratified at Florence in 1439. The union failed of its purpose, but by his prudent conduct toward the Ottomans he succeeded in holding possession of Constantinople till his death.

JOHN, king of England, youngest son of Henry II. and Eleanor of Aquitaine, and third king of the Plantagenet family, was born December 24, 1167. He was his father's favorite child, and Henry hoped to bestow on him the kingdom of Ireland. The Irish princes did homage to John at Oxford in 1177, and in 1185 he was sent to Ireland. His arrogant behavior roused the resentment of the natives, and he was recalled in disgrace. In the last revolt of Richard against Henry, John was base enough to join with his father's enemies. This treachery was the death-blow of Henry II. (1189.) Richard, on his accession, made ample provision for John, giving him several English counties, and marrying him to the heiress of the great earldom of Gloucester. But he had so little trust in his brother's character that, before his own departure on the third crusade, he bound John to stay away from England for three years. At the end of the term John returned, and harassed Richard's justiciar, William Longchamp. The unpopularity of Longchamp enabled John, aided by the archbishop of Rouen, to lead a revolutionary movement by which Longchamp was deprived of the justiciarship, and John recognized as *summus rector* of the kingdom; but the real power remained with the archbishop of Rouen. When the news of the king's captivity arrived John entered into an active alliance with Philip II. of France, Richard's malignant enemy, and tried to seize the reins of government, asserting that the king was dead. But he was baffled by the fidelity of Richard's ministers and mother, and at Richard's return his castles had to be surrendered to the king. Richard treated John with great generosity, and for the rest of his reign John gave no further trouble. Richard on his deathbed declared John his heir. The principle of primogeniture, now generally adopted, would have pointed out Arthur of Brittany, son of John's elder brother Geoffrey, as the heir, and Philip II. made himself the champion of Arthur. John made fresh enemies by divorcing his wife, and marrying Isabella, heiress of the count of Angoulême, who was already betrothed to the Count of La Marche. The anger of the La Marche family caused a fresh outbreak of war, in which Arthur became involved. In a misguided attempt to capture his grandmother Eleanor, in the castle of Mirabeau, he was defeated and taken prisoner by John, who marched with great swiftness to his mother's aid. Arthur now disappears from history; and, though there is no certain information about his death, it was generally believed at the time that John murdered him. Philip's court of peers declared John guilty, and sentenced him to forfeiture. John abandoned himself to pleasure, and made no attempt to defend his dominions; he showed such complete indifference while Philip was reducing castle after castle in Normandy that it was said he was spellbound by witchcraft. In 1204 all Normandy was lost. Anjou, Maine, and part of Aquitaine soon followed the fate of Normandy; John made only feeble or abortive attempts to save them. In 1205 his great quarrel with the church began. The monks of Canterbury had elected their sub-prior to the archbishopric, and John had nominated a minister of his own; all parties appealed to Pope Innocent III., who took the matter into his own hands, and ordered the convent proctors to elect Stephen Langton, an Englishman already distinguished by learning and character. John's refusal to accept Langton brought sentence of interdict on his kingdom (1208). He was personally excommunicated in 1209, and in 1211 the pope issued a bull deposing him from his throne; the execution of the decree was committed to Philip, who prepared to invade England. John at last gave way, moved chiefly by a prophecy that on the next Ascension Day he would be no longer king. He made an abject submission to the papal legate Pandulph, agreeing to hold his kingdom henceforth as a tributary fief of the popedom. Thus the ecclesiastical difficulty was settled, but now John had to settle a quarrel with his own people. He had incurred their hatred by his personal vices, by his cruelty and perfidy, of which the supposed murder of Arthur was only one instance among many, and by his exaction of taxes greatly in excess of the customary rates. The barons of the north began the quarrel by refusing to accompany John on the expedition to France which he planned immediately after his absolution, alleging that their tenures did not oblige them to service abroad. Langton restrained the king from doing immediate vengeance on the barons, and in the meantime an important assembly was held at St. Albans (the first to which representatives from the towns are known to have been summoned), at which the justiciar promised in the king's name that the laws of Henry I. should be observed. At an assembly at St. Paul's the same year, Langton, who was the molding spirit of the movement, produced the charter of Henry I., which became the basis of Magna Charta. John was now bent on trying to knit together the Germanic confederacy against Philip, which had been originated by Richard. He showed both policy and energy in this matter, but the barons of Poitou failed him at the critical moment of the war, and his nephew the emperor Otho was utterly defeated by Philip at Bouvines. John was forced to conclude the peace of Chinon (1214), by which he ceded to Philip all his claims on lands lying north of the Loire. He had scarcely returned to England when his barons formed a confederacy against him at Bury St. Edmunds. He attempted to bribe the clergy by granting them free election; but they stood firm to the national cause. The city of London gave its adhesion to the barons, and John found himself abandoned by all. He was obliged to grant the demands of the barons, and to sign (at Runnymede, June 15, 1215), the Great Charter, which for two hundred years was to be the watchword of English freedom. John signed the charter without the least intention of keeping it, and he found a powerful ally in his new master Innocent III., who issued a bull against the charter, and suspended Langton. Langton went to Rome to appeal, and the patriot party was thus deprived of its wisest leader. War soon broke out again, but John was able to obtain a host of foreign mercenaries, and the barons were driven to make alliance with France. Louis, son of Philip II., arrived in England in May, 1216, and John's unusual audacity and success deserted him at once. In three months the greater part of the country was in the hands of Louis. Yet the national mistrust of the foreigner was already causing a reaction in favor of John, when in marching across the Wash he met with the accident which led to his death. He was overtaken by the tide, lost all his baggage and treasure, and narrowly escaped himself. Vexation and fatigue, aggravated by excess in eating and drinking, brought on an attack of dysentery; with difficulty he reached Newark, where he died October 19, 1216.

JOHN I., king of France, son of Louis X. and Clementia of Hungary, was born after his father's death, November 15, 1316, and only lived seven days.

JOHN II., surnamed the Good, son of Philip VI. and Jane of Burgundy, was born in 1319, and succeeded his father in 1350. On September 19, 1356, he was defeated and taken prisoner by the Black Prince at the battle of Poitiers. He gained his liberty at the peace of Bretigny, in 1360; but his son, the duke of Anjou, whom he left as hostage in England, having fled, John thought himself bound to return to captivity. He died in London in 1364.

JOHN II., Casimir, king of Poland, second son of Sigismund III. and the duchess Constantia of Austria, was born March 21, 1609. After journeying in several countries of Europe, he in 1640, joined the Jesuit order at Rome, and shortly afterward was chosen cardinal. Subsequently he returned to Poland, where he resided as a layman until the death of his brother, November 20, 1648, when he succeeded him on the throne. In September, 1668, he abdicated, after which he went to France, and became abbot of St. Germains de Prés and of St. Martin at Nevers. He died September 16, 1672.

JOHN III., Sobieski, king of Poland, son of Jacob Sobieski, castellan of Cracow, was born June 2, 1624, at Olesko in Galicia. He so distinguished himself in the defensive wars of Poland, that in 1667 he received the supreme command of the army, and on the death of Michael Corybut was chosen king, May 20, 1674. He died June 17, 1696.

JOHN (JOÃO) I., king of Portugal, the natural son of Pedro I. (el Justicieiro), was born at Lisbon April 22, 1357, and in 1364 was created grand-master of Aviz. On the death of his lawful brother, Ferdinand I., without male issue, in October, 1383, strenuous efforts were made in various quarters to secure the succession in the legitimate line for Beatrice, the only child of Ferdinand I., who as heiress apparent had been married to John I. of Castile; but the popular voice declared decisively against an arrangement by which Portugal would virtually have become a Spanish province, and John was after violent tumults proclaimed protector and regent in the following December. In April, 1385, he was unanimously chosen king by the estates of the realm at Coimbra, and the coronation took place some little time afterward. The king of Castile resorted to arms on behalf of his wife, and invested Lisbon, but the besieging army was compelled by the ravages of a pestilence to withdraw, and subsequently, by the decisive battle of Aljubarrota (August 14, 1385), the stability of John's throne was permanently secured. In 1415 Ceuta was taken from the Moors by his sons who had been borne to him by his wife Philippa, daughter of John, duke of Lancaster; specially distinguished in the siege was Prince Henry, afterward generally known as "the Navigator," who in this and also in the following reign did so much to prepare the way for the position of colonial importance subsequently held by Portugal. Porto Santo and Madeira were occupied respectively in 1419 and 1420. John I., sometimes surnamed "the Great," and sometimes "father of his country," died August 11, 1433, in the forty-eighth year of a reign which had been characterized by great prudence, ability, and success; he was succeeded by his son Edward or Duarte, so named out of compliment to Edward III. of England.

JOHN II., "the Perfect," king of Portugal, succeeded his father, Alphonso V., in August, 1481. His first business after ascending the throne was to curtail with a vigorous hand the overgrown power of his aristocracy; noteworthy incidents in the contest were the execution (in 1483) of the duke of Braganza for correspondence with Castile, and the murder, by the king's own hand, of the youthful duke of Viseu for conspiracy. This reign was signalized by Bartolommeo Dias' discovery of the Cape of Good Hope in 1486, and also by the equipment (1493) of a squadron for exploration of the new world recently discovered by Columbus. The latter proceeding led to disputes with Castile, until the claims of the disputants were adjusted by the famous treaty of Tordesillas (June 7, 1494). John II. died, without leaving male issue, in October, 1495, and was succeeded by his brother-in-law Emmanuel (Manoel) I.

JOHN III., of Portugal, was born at Lisbon, June 6, 1502, and ascended the throne as successor of his father, Emmanuel I., in December, 1521. In 1524 he married Catherine, sister to the Emperor Charles V., who in turn shortly afterward married the infanta Isabella, John's sister. Succeeding to the crown at a time when Portugal was at the height of its political power, and Lisbon in a position of commercial importance previously unknown, John III., unfortunately for his dominions, yielded so far to the counsels of the clerical party among his subjects as to consent to the introduction of the Inquisition (about 1526); this led to measures of tyranny and oppression which, notwithstanding the enactment of many wise laws, soon avenged themselves in disastrous consequences to the commercial and social prosperity of his kingdom. The conflicts in which Portugal engaged with the Moors and the Turks during his reign were comparatively unfruitful of results. He died of apoplexy on June 6, 1557, and was succeeded by his grandson Sebastian, then a child of only three years.

JOHN IV., "the Fortunate," of Portugal, was born at Villaviciosa in March, 1603, succeeded to the dukedom of Braganza, in 1630, and married Luisa de Guzman, eldest daughter of the duke of Medina Sidonia, in 1633. By the unanimous voice of the people, he was raised to the throne of Portugal (of which he was held to be the legitimate heir) at the revolution effected in December, 1640, by a conspiracy of the nobles against the grievances inflicted by Spain and the insolence of Philip IV.'s minister, the duke of Olivarez. His accession ultimately led to a protracted war with Spain, of which the final issue—the recognized independence of Portugal—did not declare itself until a subsequent reign (1668). He died after a prosperous reign of sixteen years, on November 6, 1656, and was succeeded by his son Alphonso VI.

JOHN V., of Portugal, was born at Lisbon on October 22, 1689, and succeeded his father Pedro II., in December, 1706, being proclaimed on January 1, 1707. One of his first acts was to intimate his adherence to the Grand Alliance, which his father had joined in 1703, and his resolution to take his full share in the war then in progress. Accordingly his general Das Minas, along with Lord Galway, advanced into Castile, but sustained the defeat of Almanza (April 14th). In October, 1709, he married Maria Anna, daughter of Leopold I., thus strengthening the alliance with Austria; the series of campaigns which ensued were equally unsuccessful with the first, but ultimately terminated in a favorable peace with France in 1713, and with Spain in 1715. The rest of his long reign presents no striking features, except that it was characterized by perfect subservience on his part to the clergy, the kingdom being administered by ecclesiastical persons and for ecclesiastical objects to an extent that gave him the best of rights to the title "Most Faithful King," bestowed upon him and his successors by a bull of pope Benedict XIV., in 1748. John V. died on July 31, 1750, and was succeeded by his son Joseph.

JOHN VI., of Portugal, was born at Lisbon, May 13, 1769, and received the title of prince of Brazil in 1788. In 1792 he assumed the reigns of government in name of his mother Queen Mary I., who had become insane. In 1799 he assumed the title of regent, which he retained until his mother's death in 1816. The political relations of Portugal with England and France from the period of the first coalition against France in 1793 to the treaty of Fontainebleau (1807), by which the partition of the first-named country was agreed upon, will be elsewhere explained (see PORTUGAL). In consequence of the latter treaty the prince of Brazil found it necessary to leave the kingdom (November, 1807), and transfer the seat of his government to Rio Janeiro. The occupation and annexation of the whole country immediately ensued; against this he recorded his protest in November, 1808, and in a more practical manner by the seizure of French Guiana in the following year. He also entered into alliance with England in 1810, and was a party to the treaty of Paris in 1814. In 1816 he was recognized as king of Portugal on the death of Mary, but he continued to reside abroad, the consequence was the spread of a feeling of natural dissatisfaction, which resulted in the peaceful revolution of 1820, and the proclamation of a constitutional government, to which he swore fidelity on his return to Portugal in 1822. In the same year, and again in 1823, he had to suppress a rebellion led by his son, Dom Miguel, whom he ultimately was compelled to banish in 1824. He died at Lisbon March 26, 1826, and was succeeded by Pedro IV.

JOHN, king of Saxony, brother and successor of Frederick Augustus II., and younger son of Duke Maximilian and Caroline Parma, was born at Dresden December 12, 1801. On ascending the throne in 1854, he followed the same enlightened and liberal policy as his brother, and introduced several reforms of great benefit to the country. In the war of 1866 he sided with Austria against Prussia, and on that account had to submit to the payment of a large sum of money and the cession of the fortress of Königstein at the conclusion of peace. He, however, afterward entered the North German federation, and his troops took a very prominent and distinguished part in the Franco-Prussian war of 1870–71. He died at Dresden, October 29, 1873.

JOHN (JUAN) I., king of Aragon, was born December 27, 1350, and succeeded his father, Pedro IV., in 1387. He left the affairs of his kingdom to a large extent in the hands of his wife Yolande, a granddaughter of John the Good, king of France, while he himself led a life of pleasure and inglorious ease. He died in 1395, in consequence of an accident on the hunting field, and was succeeded by his brother Martin.

JOHN II., king of Aragon from 1458, was the younger son of Ferdinand I. (the Just), and was born June 29, 1397. He was twice married—first to Blanche, daughter of Charles III. of Navarre, by whom he had three children (Carlos, heir to the crowns of Navarre and Aragon; Blanche, for some time the wife of Henry IV. of Castile; and Eleanor, wife of Gaston, count of Foix); and afterward (in 1447) to Joanna Henriquez, of the blood-royal of Castile, by whom he became the father of Ferdinand V. (the Catholic). In May, 1458, John succeeded his brother in Aragon, Sicily, and Sardinia; but the influence of Joanna Henriquez prevented him from recognizing the legitimate claims of his own eldest son to the reversion; an attempt by Carlos to obtain support in other quarters led to his arrest and imprisonment, from which he was released only after Catalonia had risen in arms and the king of Castile had begun an irruption into Navarre. Shortly after this temporary triumph Carlos was carried off by a fever in September, 1461, bequeathing the crown of Navarre to his sister Blanche and her posterity. Ferdinand, the half-brother of Carlos, was now put forward as heir apparent of the Aragonese throne, but the indignant Catalonians raised a revolt which did not come to an end until December, 1472. Immediately afterward John entered upon a war with Louis XI. of France in consequence of disputes about Roussillon and Cerdagne; first successful, but afterward worsted, this bold and energetic but ambitious and unjust prince died January 20, 1479, before the conclusion of the peace. He was succeeded by Ferdinand V.

JOHN (JUAN) I., king of Castile and Leon, born in August, 1358; was the son of Henry II. ("El Bastardo"), whom he succeeded in 1379. At his accession the Lancasterian claims to the throne of Castile were renewed, and gained the support of Portugal; the result was a war with the latter power, which ended in a marriage (1382) between John and the Portuguese infanta. The peace thus ratified did not subsist long, for, on the death of Ferdinand of Portugal in the following year without male issue, John sought to establish a claim to the succession on behalf of his wife, and crossing the frontier penetrated as far as Lisbon, to which he began to lay siege while John, the grand-master of Aviz, was being proclaimed king. Compelled by pestilence and other unfavorable circumstances to withdraw, he encountered the Portuguese in the neighborhood of Aljubarrota in August of 1385; the disastrous defeat he there sustained was followed by a descent of John of Gaunt, duke of Lancaster (July, 1386), which led to the conclusion of the peace of Troncoso (1387), in virtue of which the constantly recurring disputes about the crown were settled by the marriage of the crown prince Henry to Catherine, the representative of the Lancasterian claims. The last four years of the reign of John were marked by important legislative reforms in the town brotherhoods (*hermandades*), in the army, and in the system of taxation. In 1390, he was killed by a fall from his horse, and was succeeded by his son Henry III.

JOHN II., of Castile and Leon, grandson of the preceding, succeeded to the throne when only twenty-two months old. Until 1412 the regency was shared with his mother Catherine by his uncle Ferdinand (afterward Ferdinand IV. of Aragon); this period was marked by much internal prosperity and by important conquests from the Moors, especially by the capture of Antequera. Unfortunately for Castile, Ferdinand was called away (in 1412) to occupy the throne of Aragon; but it was not until after the death of Catherine in 1418 that John's weakness and incapacity came to be fully seen. He died in June, 1454.

JOHN, DON, of Austria, was the bastard son of the Emperor Charles V , by Barbara Blomberg, the daughter of a well-to-do citizen of Ratisbon. He was born in that free imperial city on February 24, 1545, the anniversary of his father's birth and coronation, and of the battle of Pavia. On another visit to Ratisbon, in the following year, after arranging a marriage between the fair Barbara and one of his German courtiers, Hieronymus Piramis Kegell, the emperor carried off the young Geronimo, as he was then conveniently called. The worthy Don Luis de Quijada, to whose care he was hereupon confided, watched over his early childhood with jealous care. It was at first sought to conceal the connection between the emperor and the child of his declining years, who was brought up in retirement, chiefly in Quijada's castle of Villagarcia, in Spain. In the year before the emperor's death, however, the boy was brought into the immediate neighborhood of San Yuste, where his presence brightened the close of his father's life. In his last will Charles V. acknowledged "Geronimo" as his son, and commended him to the care of his successors, expressing a wish that he should take monastic vows, but that, in the event of his declining these, a handsome income should be provided for him out of the revenues of Naples.

In September, 1559, the boy was publicly recognized by King Philip II. as his brother; and henceforth he resided at court, under the name of Don Juan d'Austria, as a member of the royal family. With the heir to the throne, the unhappy Don Carlos, his relations were so friendly that when, at the end of the year 1567, the infante was plotting his flight from Spain, he confided his more or less treasonable scheme to Don John, and even requested the latter to accompany him on his expedition. A sense of duty, at which it is difficult to cavil, prompted Don John to reveal this unsought confidence to the king, and thus he helped to bring about the fatal catastrophe, as it proved, of the imprisonment of Don Carlos.

It was not the habit of Philip II. to allow those who served him to choose their own seasons and methods of doing so. The impetuous Don John, whom the king would have preferred to see a monk, had, in 1565, been refused permission to serve in the fleet ordered to sail for the relief of Malta; and an express royal command had been needed to bring him back when on the point of making the voyage on his own account. His obedience was rewarded when, in 1568, he was appointed to the great office of *capitan general de la mar*. His first actual service, however, was by land, and of a kind unattractive to any but the genuine Spanish blood. In 1569 he was charged with a task, the execution of which the captain-general of Granada, the marquis of Mondejar, had begun, but was unwilling relentlessly to complete. The reformation of the converted Moriscoes had come to mean the suppression of the remnants of their national as well as religious life; and after the insurrection of Aben Humeya had been overcome, the wholesale deportation of all the Moriscoes from their habitations was decreed, and executed on All Saints' Day, 1570. The capture of Guejar had been his first deed of arms (December, 1569); it had been followed by that of Galera; and in August, 1570, the Alpujarras mountains were cleared of the Moriscoes, of whom more than 10,000 are said to have been killed or captured in the space of a single month.

Before long a nobler crusade engaged the energy of the obedient and successful commander. Philip II., though he was during nearly the whole of his reign engaged in hostilities with the Turks, had hitherto displayed no great vigor in resisting their still unceasing inroads upon the domain of Christendom. His fleet had for the time saved Malta; but Cyprus was torn by the infidel from the Venetians without his having offered timely coöperation for its defense (1571); and the barbarous proceedings of the conquerors had filled Europe with horror and shame. Not even the waters of the Adriatic were secure from the Turkish vessels, and the league which shortly before the loss of Cyprus papal diplomacy had succeeded in knitting between Spain, Venice, and Rome, and which purported to aim at the extinction of the Mahometan power, had as yet remained a dead letter. At length the forces of the allies — 208 galleys, 6 galeases, and a number of smaller craft, with more than 20,000 Spanish, German, and Italian soldiers on board—assembled at Messina. Don John of Austria had been named admiral of the league, with power (granted at the request of Pope Pius V.) of free action after consultation with his captains and the Venetian commander. Thus the day of Lepanto was in every sense his own, though it was his good fortune that the Turks had underestimated his numbers, which were in truth little inferior to theirs. The Christian victory was complete. Only forty of the Turkish vessels effected their escape, the rest being burnt or captured; and 35,000 of their men were slain or captured, while 15,000 Christian galley-slaves were released. At Constantinople apprehensions were even entertained of an immediate attack on the part of the victors. The battle of Lepanto (October 7, 1571,) was, as Ranke observes, like that of Actium, a decisive historic struggle between West and East; and the ecstatic joy which it inspired was shared by all Christian Europe. But though, on receiving the great news of a success which seemed in its momentousness to surpass any of his father's achievements, Philip II. had vowed to carry on this Christian war, jealousy between the allies wasted the immediate fruits of the victory, and the by no means remotely possible consequences of an active Franco-Turkish alliance inclined the king of Spain to keep his brother inactive in Sicily. Soon the ever vigilant suspicions of Philip were aroused by information which he received—partly from the candid Don John himself—as to the visions which (instigated by the inveterate papal habit of giving away kingdoms before they had been conquered) suggested themselves to the restless imagination of the hero of Lepanto. At one time Albania and the Morea entreated him to reign over them, after he should have previously freed them from the Turkish yoke; next, Rhodes besought the aid of his invincible arm for the work of its liberation. Meanwhile, after the Turks had brought together another fleet he was unable to force them to accept another battle at Navarino (September, 1572); and soon afterward Venice, by concluding a separate treaty of peace with the sultan, put an end to the league which had been victorious at Lepanto. Spain was by herself no match for the Turkish power; and though in 1573 Don John captured Tunis, it was recaptured in the following year.

He was appointed (in 1576) to the government of the Netherlands, vacant by the death of Requesens. The administration of the latter had not been intended to introduce any radical change into the system of his predecessor Alva; his military operations had been only partially successful; and the pacification of Ghent (October, 1576), concluded since his death, had greatly improved the prospects of William of Orange and the insurrection. Don John found himself obliged to grant the perpetual edict (February, 1577), which in accordance with the pacification dismissed the Spanish troops designed by him for the conquest of England, and held his entry into Brussels (May 1st) amidst popular acclamations. In secret, however, he was counseling and preparing a renewal of the war; and before the end of the summer he took Namur by a stratagem. The answer was the proclamation of Orange as protector of Brabant, and the nomination as governor-general of the archduke Matthias, under whom Orange continued to hold the actual supremacy, while Don John's control was almost entirely confined to the southwestern part of the Netherlands. He now (January, 1578), declared war against the insurgent provinces, and the dismissed Spanish troops were soon with other forces reassembling under his standard. A large army brought from Lombardy by Alexander Farnese, prince of Parma (Don John's nephew), raised the Spanish forces to a virtual equality in numbers with those of their opponents; and Farnese's victory of Gemblours (January 31, 1578), hopefully opened the campaign. Such was the situation when Don John was removed by death. After having shortly before escaped the dagger of an English assassin (a Catholic refugee, who had hoped by the act to secure the pardon of the queen), Don John succumbed to a sudden illness at Namur on October 1, 1578.

JOHN of Damascus. See Damascenus.

JOHN of Gaunt. See Lancaster, House of.

JOHN, St., of Nepomuk, or Pomuk, the patron saint of Bohemia, was born at Pomuk about 1330. After studying at the university of Prague he took holy orders and was for some time a priest in the diocese of Prague. In 1372 he is mentioned as imperial notary; in 1380 he became rector of the church of St. Gall in Prague, and notary and secretary of the archbishop; and in 1381 he was made doctor of canon law and canon of the metropolitan chapter. He appears to have taken an important part as adviser or supporter of the archbishop John of Janstein in his disputes with King Wenceslaus, and on this account, after suffering cruel torture, he was drowned in the Moldau.

JOHN of Salisbury (*c.* 1115–1180) a distinguished writer of the twelfth century, was born at Salisbury in Wiltshire. From the cognomen *Parvus*, which he applies to himself, and from the fact that he was of Saxon, not of Norman race, it may be inferred that his name was Short, or Small, or Little. Few details are known regarding his life.

JOHN, Prester. See Prester John.

JOHNS HOPKINS, a university established at Baltimore under the will of Johns Hopkins, a wealthy merchant, who endowed it with over $3,000,000. It was opened in September, 1876, with D. C. Gilman, LL.D., as president, and a full corps of teachers. Great attention is paid to scientific instruction, and the institution is rich in scientific works and laboratories.

JOHNSON, Andrew, seventeenth president of the United States, was born in Raleigh, N. C., December 29, 1808. His youth was passed in such poverty that it was not till during his apprenticeship as tailor that he learned to read. His wife taught him to write and cipher after their marriage. Settling in Greenville, Tenn., he worked at his trade, and in 1828 began to take an active part in politics, organizing a workingman's party, by which he was elected to several local offices. He served in the State legislature; from 1843 till 1853 he was member of Congress; in 1853, and again in 1855, he was elected governor of Tennessee; and in 1857 he took his seat as United States senator from Tennessee. His independence procured him prominence in the senate. In opposition to the general policy of the Democratic party, whose nominee he was, he ardently supported the homestead bill; and, though in the important presidential election of 1860 he had supported Breckenridge and Lane, the candidates of the southern wing of the Democratic party, yet, when Lincoln was elected, Johnson made a strong speech in the senate, denouncing secession, and pledging himself to unconditional support of the Union. This loyalty to the Union subjected him to grave personal danger from the secessionists of Tennessee, when he returned to the State to organize a Union party. In 1862 Lincoln appointed Johnson military governor of Tennessee, a post of difficulty and danger, in which he displayed an amount of energy and ability in dealing with the secessionists that attracted attention in the north, and led to his nomination for the vice-presidency by the Republican convention of 1864, which nominated Lincoln for the presidency. When, a few weeks after his inauguration, the assassination of Lincoln, on April 14, 1865, made Johnson president, his vigorous denunciation of treason as "a crime that must be punished" placed him for a time high in public favor. The rest of his term of office was spent in dissension with Congress as to the conditions upon which the seceding States should be allowed to return to the Union. Johnson vetoed bill after bill; but Congress passed them over his veto. In August, 1866, the president, attended by members of his cabinet, made a tour through several of the northern and western States, denouncing the action of Congress as rebellious, and appealing to the people to support him. But at the congressional elections of that year the policy of Congress was indorsed by large majorities. The conflict became still more bitter, and was at last brought to a crisis by the president's attempts to remove Secretary Stanton from office, after the senate had refused its approval. The Republicans in Congress claimed that Johnson had violated the tenure-of-office law, and on February 24, 1868, the House of Representatives passed a resolution impeaching him for high crimes and misdemeanors. At the trial before the senate the articles of impeachment were not sustained. A two-thirds majority was necessary for conviction; and thirty-five voted "guilty," nineteen "not guilty." On March 4, 1869, Johnson was succeeded in the presidency by U. S. Grant. Retiring to Greenville, he immediately prepared to reënter public life; and in January, 1875, he was elected United States senator. He died July 31, 1875.

JOHNSON, Samuel, one of the most eminent

English writers of the eighteenth century, was the son of Michael Johnson, who was, at the beginning of that century, a magistrate of Lichfield, and a bookseller of great note in the midland counties. At his house, a house that is still pointed out to every traveler who visits Lichfield, Samuel was born on September 18, 1709. In the child the physical, intellectual, and moral peculiarities which afterward distinguished the man were plainly discernible: great muscular strength accompanied by much awkwardness and many infirmities; great quickness of parts, with a morbid propensity to sloth and procrastination; a kind and generous heart, with a gloomy and irritable temper. He had inherited from his ancestors a scrofulous taint, which it was beyond the power of medicine to remove. His parents were weak enough to believe that the royal touch was a specific for his malady. In his third year he was taken up to London, inspected by the court surgeon, prayed over by the court chaplains, and stroked and presented with a piece of gold by Queen Anne. The boy's features, which were originally noble and not irregular, were distorted by his malady. His cheeks were deeply scarred. He lost for a time the sight of one eye; and he saw but very imperfectly with the other. But the force of his mind overcame every impediment. Indolent as he was, he acquired knowledge with such ease and rapidity that at every school to which he was sent he was soon the best scholar. From sixteen to eighteen he resided at home, and was left to his own devices. He learned much at this time, though his studies were without guidance and without plan. He ransacked his father's shelves, dipped into a multitude of books, read what was interesting, and passed over what was dull. An ordinary lad would have acquired little or no useful knowledge in such a way; but much that was dull to ordinary lads was interesting to Samuel. He read little Greek; for his proficiency in that language was not such that he could take much pleasure in the masters of Attic poetry and eloquence. But he had left school a good Latinist, and he soon acquired, in the large and miscellaneous library of which he now had the command, an extensive knowledge of Latin literature. That Augustan delicacy of taste which is the boast of the great public schools of England he never possessed. But he was early familiar with some classical writers who were quite unknown to the best scholars in the sixth form at Eton. He was peculiarly attracted by the works of the great restorers of learning. Once, while searching for some apples, he found a huge folio volume of Petrarch's works. The name excited his curiosity, and he eagerly devoured hundreds of pages. Indeed, the diction and versification of his own Latin compositions show that he had paid at least as much attention to modern copies from the antique as to the original models.

While he was thus irregularly educating himself, his family was sinking into hopeless poverty. Old Michael Johnson was much better qualified to pore upon books, and to talk about them, than to trade in them. His business declined; his debts increased; it was with difficulty that the daily expenses of his household were defrayed. It was out of his power to support his son at either university; but a wealthy neighbor offered assistance; and, in reliance on promises, which proved to be of very little value, Samuel was entered at Pembroke College, Oxford.

At Oxford Johnson resided during about three years. He was poor, even to raggedness; and his appearance excited a mirth and a pity which were equally intolerable to his haughty spirit. He was driven from the quadrangle of Christ Church by the sneering looks which the members of that aristocratical society cast at the holes in his shoes. Some charitable person placed a new pair at his door; but he spurned them away in a fury. Distress made him, not servile, but reckless and ungovernable.

The time drew near at which Johnson would, in the ordinary course of things, have become a bachelor of arts; but he was at the end of his resources. Those promises of support on which he had relied had not been kept. His family could do nothing for him. His debts to Oxford tradesmen were small indeed, yet larger than he could pay. In the autumn of 1731 he was under the necessity of quitting the university without a degree. In the following winter his father died. The old man left but a pittance; and of that pittance almost the whole was appropriated to the support of his widow. The property to which Samuel succeeded amounted to no more than twenty pounds.

His life, during the thirty years which followed, was one hard struggle with poverty. The misery of that struggle needed no aggravation, but was aggravated by the sufferings of an unsound body and an unsound mind. Before the young man left the university, his hereditary malady had broken forth in a singularly cruel form. He had become an incurable hypochondriac. He said long after that he had been mad all his life, or at least not perfectly sane; and, in truth, eccentricities less strange than his have often been thought ground sufficient for absolving felons, and for setting aside wills. A deep melancholy took possession of him, and gave a dark tinge to all his views of human nature and of human destiny. Such wretchedness as he endured has driven many men to shoot themselves or drown themselves. But he was under no temptation to commit suicide. He was sick of life; but he was afraid of death; and he shuddered at every sight or sound which reminded him of the inevitable hour.

With such infirmities of body and of mind, this celebrated man was left, at two-and-twenty, to fight his way through the world. He remained during about five years in the midland counties. At Lichfield, his birthplace and his early home, he had inherited some friends and acquired others. At Lichfield, however, Johnson could find no way of earning a livelihood. He became usher of a grammar school in Leicestershire; he resided as an humble companion in the house of a country gentleman; but a life of dependence was insupportable to his haughty spirit. He repaired to Birmingham, and there earned a few guineas by literary drudgery. In that town he printed a translation, little noticed at the time, and long forgotten, of a Latin book about Abyssinia. He then put forth proposals for publishing by subscription the poems of Politian, with notes containing a history of modern Latin verse; but subscriptions did not come in, and the volume never appeared.

While leading this vagrant and miserable life Johnson fell in love. The object of his passion was Mrs. Elizabeth Porter, a widow who had children as old as himself. She accepted, with a readiness which did her little honor, the addresses of a suitor who might have been her son. The marriage, however, in spite of occasional wranglings, proved happier than might have been expected. The lover continued to be under the illusions of the wedding-day till the lady died in her sixty-fourth year.

His marriage made it necessary for him to exert himself more strenuously than he had hitherto done. He took a house in the neigborhood of his native town, and advertised for pupils. But eighteen months passed away. and only three pupils came to his academy. Indeed, his appearance was so strange, and his temper so violent, that his schoolroom must have resembled an ogre's den. Nor was the tawdry painted grandmother whom he called his Titty well qualified to make provision for the comfort of young gentlemen. David Garrick, who was one of the pupils, used, many years later, to throw the best company of London into convulsions of laughter by mimicking the endearments of this extraordinary pair.

At length Johnson, in the twenty-eighth year of his age, determined to seek his fortune in the capital as a literary adventurer. He set out with a few guineas, three acts of the tragedy of *Irene* in manuscript, and two or three letters of introduction from his friend Walmesley.

Some time appears to have elapsed before Johnson was able to form any literary connection from which he could expect more than bread for the day which was passing over him. He never forgot the generosity with which Hervey, who was now residing in London, relieved his wants during this time of trial. The effect of the privations and sufferings which he endured at this time was discernible to the last in his temper and his deportment. His manners had never been courtly. They now became almost savage. Being frequently under the necessity of wearing shabby coats and dirty shirts, he became a confirmed sloven. Being often very hungry when he sat down to his meals, he contracted a habit of eating with ravenous greediness. Even to the end of his life, and even at the tables of the great, the sight of food affected him as it affects wild beasts and birds of prey. About a year after Johnson had begun to reside in London he was fortunate enough to obtain regular employment from Cave, an enterprising and intelligent bookseller, who was proprietor and editor of the *Gentleman's Magazine*. That journal, just entering on the ninth year of its long existence, was the only periodical work in the kingdom which then had what would now be called a large circulation. It was, indeed, the chief source of parliamentary intelligence. It was not then safe, even during a recess, to publish an account of the proceedings of either House without some disguise. Cave, however, ventured to entertain his readers with what he called "Reports of the Debates of the Senate of Lilliput." France was Blefuscu; London was Mildendo; pounds were sprugs; the duke of Newcastle was the Nardac secretary of state; Lord Hardwicke was the Hurgo Hickrad; and William Pulteney was Wingul Pulnub. To write the speeches was, during several years, the business of Johnson.

A few weeks after Johnson had entered on these obscure labors, he published a work which at once placed him high among the writers of his age. It is probable that what he had suffered during his first year in London had often reminded him of some parts of that noble poem in which Juvenal had described the misery and degradation of a needy man of letters, lodged among the pigeons' nests in the tottering garrets which overhung the streets of Rome. Pope's admirable imitations of Horace's *Satires* and *Epistles* had recently appeared, were in every hand, and were by many readers thought superior to the originals. What Pope had done for Horace, Johnson aspired to do for Juvenal. The enterprise was bold, and yet judicious. For between Johnson and Juvenal there was much in common, much more certainly than between Pope and Horace.

Johnson's *London* appeared without his name in May, 1738. He received only ten guineas for this stately and vigorous poem; but the sale was rapid, and the success complete. A second edition was required within a week. The name of the author was soon discovered; and Pope, with great kindness, exerted himself to obtain an academical degree and the mastership of a grammar school for the poor young poet. The attempt failed, and Johnson remained a bookseller's hack.

The most remarkable of the persons with whom at this time Johnson consorted was Richard Savage, an earl's son, a shoemaker's apprentice, who had seen life in all its forms, who had feasted among blue ribbons in Saint James' Square, and had lain with fifty pounds weight of irons on his legs in the condemned ward of Newgate. During some months Savage lived in the closest familiarity with Johnson; and then the friends parted, not without tears. Johnson remained in London to drudge for Cave. Savage went to the west of England, lived there as he had lived everywhere, and in 1743 died, penniless and heartbroken, in Bristol jail.

Soon after his death, while the public curiosity was strongly excited about his extraordinary character and his not less extraordinary adventures, a life of him appeared widely different from the catchpenny lives of eminent men which were then a staple article of manufacture in Grub street. The style was indeed deficient in ease and variety, and the writer was evidently too partial to the Latin element of our language.

The *Life of Savage* was anonymous; but it was well known in literary circles that Johnson was the writer. During the three years which followed, he produced no important work; but he was not, and indeed could not be, idle. The fame of his abilities and learning continued to grow. Warburton pronounced him a man of parts and genius; and the praise of Warburton was then no light thing. Such was Johnson's reputation that, in 1747, several eminent booksellers combined to employ him in the arduous work of preparing a *Dictionary of the English Language*, in two folio volumes. The sum which they agreed to pay him was only fifteen hundred guineas; and out of this sum he had to pay several poor men of letters who assisted him in the humbler parts of his task.

Johnson had flattered himself that he should have completed his *Dictionary* by the end of 1750; but it was not till 1755 that he at length gave his huge volumes to the world. During the seven years which he passed in the drudgery of penning definitions and marking quotations for transcription, he sought for relaxation in literary labor of a more agreeable kind. In 1749 he published the *Vanity of Human Wishes*, an excellent imitation of the tenth satire of Juvenal. It is in truth not easy to say whether the palm belongs to the ancient or to the modern poet. For the copyright of the *Vanity of Human Wishes* Johnson received only fifteen guineas.

A few days after the publication of this poem, his tragedy, begun many years before, was brought on the stage. His pupil, David Garrick, had in 1741 made his appearance on an humble stage in Goodman's Fields, had at once risen to the first place among actors, and was now, after several years of almost uninterrupted success, manager of Drury Lane Theater. The relation between him and his old preceptor was of a very singular kind. They repelled each other strongly, yet attracted each other strongly. Nature had made them of very different clay; and circumstances had fully brought out the natural peculiarities of both. Sudden prosperity had turned Garrick's head. Continued adversity had soured Johnson's temper. Garrick now brought *Irene* out, with alterations sufficient to displease the author, yet not sufficient to make the piece pleasing to the audience. The public, however, listened, with little emotion, but with much civility, to five acts of monotonous declamation. After nine representations the play was withdrawn. It is, indeed, altogether unsuited to the stage, and even when perused in the closet, will be found hardly worthy of the author.

About a year after the representation of *Irene*, Johnson began to publish a series of short essays on morals, manners, and literature. This species of composition had been brought into fashion by the success of the *Tatler*, and by the still more brilliant success of the *Spectator*. A crowd of small writers had vainly attempted to rival Addison. The *Lay Monastery*, the *Censor*, the *Freethinker*, the *Plain Dealer*, the *Champion*, and other works of the same kind had had their short day. None of them had obtained a permanent place in our literature; and they are now to be found only in the libraries of the curious. At length Johnson undertook the adventure in which so many aspirants had failed. In the thirty-sixth year after the appearance of the last number of the *Spectator* appeared the first number of the *Rambler*. From March, 1750, to March, 1752, this paper continued to come out every Tuesday and Saturday.

By the public the *Rambler* was at first very coldly received. Though the price of a number was only twopence, the sale did not amount to 500. The profits were therefore very small. But as soon as the flying leaves were collected and reprinted they became popular. The author lived to see 13,000 copies spread over England alone.

The last *Rambler* was written in a sad and gloomy hour. Mrs. Johnson had been given over by the physicians. Three days later she died. She left her husband almost broken-hearted. The chief support which had sustained him through the most arduous labor of his life was the hope that she would enjoy the fame and the profit which he anticipated from his *Dictionary*. She was gone; and in that vast labyrinth of streets peopled by 800,000 human beings, he was alone. Yet it was necessary for him to set himself, as he expressed it, doggedly to work. After three more laborious years, the *Dictionary* was at length complete. The *Dictionary* came forth without a dedication. In the preface the author truly declared that he owed nothing to the great, and described the difficulties with which he had been left to struggle so forcibly and pathetically that the ablest and most malevolent of all the enemies of his fame, Horne Tooke, never could read that passage without tears.

The *Dictionary*, though it raised Johnson's fame, added nothing to his pecuniary means. The fifteen hundred guineas which the booksellers had agreed to pay him had been advanced and spent before the last sheets issued from the press. It is painful to relate that twice in the course of the year which followed the publication of this great work he was arrested and carried to sponging houses, and that he was twice indebted for his liberty to his excellent friend Richardson. It was still necessary for the man who had been formally saluted by the highest authority as dictator of the English language to supply his wants by constant toil. He abridged his *Dictionary*. He proposed to bring out an edition of Shakespeare by subscription, and many subscribers sent in their names and laid down their money; but he soon found the task so little to his taste that he turned to more attractive employments. He contributed many papers to a new monthly journal, which was called the *Literary Magazine*. Few of these papers have much interest; but among them was the very best thing that he ever wrote, a masterpiece of reasoning and satirical pleasantry, the review of Jenyns' *Inquiry into the Nature and Origin of Evil*.

In the spring of 1758 Johnson put forth the first of a series of essays, entitled the *Idler*. During two years these essays continued to appear weekly. They were eagerly read, widely circulated, and indeed impudently pirated, while they were still in the original form, and had a large sale when collected into volumes. The *Idler* may be described as a second part of the *Rambler*, somewhat livelier and somewhat weaker than the first part.

While Johnson was busied with his *Idlers*, his mother, who had accomplished her ninetieth year, died at Lichfield. It was long since he had seen her, but he had not failed to contribute largely out of his small means to her comfort. In order to defray the charges of her funeral, and to pay some debts which she had left, he wrote a little book in a single week, and sent off the sheets to the press without reading them over. A hundred pounds were paid him for the copyright, and the purchasers had great cause to be pleased with their bargain, for the book was *Rasselas*.

The success of *Rasselas* was great, though such ladies as Miss Lydia Languish must have been grievously disappointed when they found that the new volume from the circulating library was little more than a dissertation on the author's favorite theme, the "vanity of human wishes;" that the prince of Abyssinia was without a mistress, and the princess without a lover; and that the story set the hero and heroine down exactly where it had taken them up.

By such exertions as have been described Johnson supported himself till the year 1762. In that year a great change in his circumstances took place. He had from a child been an enemy of the reigning dynasty. His Jacobite prejudices had been exhibited with little disguise both in his works and in his conversation. Even in his massy and elaborate *Dictionary* he had, with a strange want of taste and judgment, inserted bitter and contumelious reflections on the Whig party. The excise, which was a favorite resource of Whig financiers, he had designated as a hateful tax. He had railed against the commissioners of excise in language so coarse that they had seriously thought of prosecuting him. He had with difficulty been prevented from holding up the lord privy seal by name as an example of the meaning of the word "renegade." A pension he had defined as pay given to a state hireling to betray his country; a pensioner as a slave of state hired by a stipend to obey a master. It seemed unlikely that the author of these definitions would himself be pensioned. But that was a time of wonders. The head of the treasury was now Lord Bute, who was a Tory, and could have no objection to Johnson's Toryism. Bute wished to be thought a patron of men of letters; and Johnson was one of the most eminent and one of the most needy men of letters in Europe. A pension of £300 a year was graciously offered, and with very little hesitation accepted.

This event produced a change in Johnson's whole way of life. For the first time since his boyhood he no longer felt the daily goad urging him to the daily toil. He was at liberty, after thirty years of anxiety and drudgery, to indulge his constitutional indolence, to lie in bed till two in the afternoon, and to sit up talking till four in the morning, without fearing either the printer's devil or the sheriff's officer.

One laborious task indeed he had bound himself to perform. He had received large subscriptions for his promised edition of Shakespeare; he had lived on those subscriptions during some years; and he could not without disgrace omit to perform his part of the contract. His friends repeatedly exhorted him to make an effort, and he repeatedly resolved to do so. But, notwithstanding their exhortations and his resolutions, month followed month, year followed year, and nothing was done. He prayed fervently against his idleness; he determined, as often as he received the sacrament, that he would no longer doze away and trifle away his time; but the spell under which he lay resisted prayer and sacrament. His private notes at this time are made up of self-reproaches. Happily for his honor, the charm which held him captive was at length broken by no gentle or friendly hand. He had been weak enough to pay serious attention to a story about a ghost which haunted a house in Cock Lane, and had actually gone himself, with some of his friends, at one in the morning, to St. John's Church, Clerkenwell, in the hope of receiving a communication from the perturbed spirit. But the spirit, though adjured with all solemnity, remained obstinately silent; and it soon appeared that a naughty girl of eleven had been amusing herself by making fools of so many philosophers. Churchill, who, confident in his powers, drunk with popularity, and burning with party spirit, was looking for some man of established fame and Tory politics to insult, celebrated the Cock Lane ghost in three cantos, nicknamed Johnson Pomposo, asked where the book was which had been so long promised and so liberally paid for, and directly accused the great moralist of cheating. This terrible word proved effectual, and in October, 1765, appeared, after a delay of nine years, the new edition of Shakespeare.

This publication saved Johnson's character for honesty, but added nothing to the fame of his abilities and learning. The preface, though it contains some good passages, is not in his best manner. The most valuable notes are those in which he had an opportunity of showing how attentively he had during many years observed human life and human nature. The best specimen is the note on the character of Polonius. Nothing so good is to be found even in Wilhelm Meister's admirable examination of *Hamlet*. But here praise must end. Those who most loved and honored him had little to say in praise of the manner in which he had discharged the duty of a commentator. He had, however, acquitted himself of a debt which had long lain heavy on his conscience, and he sank back into the repose from which the sting of satire had roused him. He long continued to live upon the fame which he had already won. He was honored by the university of Oxford with a doctor's degree, by the Royal Academy with a professorship, and by the king with an interview, in which his Majesty most graciously expressed a hope that so excellent a writer would not cease to write. In the interval, however, between 1765 and 1775 Johnson published only two or three political tracts, the longest of which he could have produced in forty-eight hours, if he had worked as he worked on the *Life of Savage* and on *Rasselas*.

His conversation was nowhere so brilliant and striking as when he was surrounded by a few friends, whose abilities and knowledge enabled them, as he once expressed it, to send him back every ball that he threw. Some of these, in 1764, formed themselves into a club, which gradually became a formidable power in the commonwealth of letters. The verdicts pronounced by this conclave on new books were speedily known over all London, and were sufficient to sell off a whole edition in a day, or to condemn the sheets to the service of the trunkmaker and the pastrycook. Nor shall we think this strange when we consider what great and various talents and acquirements met in the little fraternity, Goldsmith was the representative of poetry and light literature, Reynolds of the arts, Burke of political eloquence and political philosophy. There, too, were Gibbon, the greatest historian, and Jones, the greatest linguist of the age. Garrick brought to the meetings his inexhaustible pleasantry, his incomparable mimicry, and his consummate knowledge of stage effect. Among the most constant attendants were two high-born and high-bred gentlemen, closely bound together by friendship, but of widely different characters and habits—Bennet Langton, distinguished by his skill in Greek literature, by the orthodoxy of his opinions, and by the sanctity of his life, and Topham Beauclerk, renowned for his amours, his knowledge of the gay world, his fastidious taste, and his sarcastic wit. To predominate over such a society was not easy. Yet even over such a society Johnson predominated.

Among the members of this celebrated body was one to whom it has owed the greater part of its celebrity, yet who was regarded with little respect by his brethren, and had not without difficulty obtained a seat among them. This was James Boswell, a young Scotch lawyer, heir to an honorable name and a fair estate. That he was a coxcomb and a bore, weak, vain, pushing, curious, garrulous, was obvious to all who were acquainted with him. That he could not reason, that he had no wit, no humor, no eloquence, is apparent from his writings. And yet his writings are read beyond the Mississippi, and under the Southern Cross, and are likely to be read as long as the English exists either as a living or as a dead language. Nature had made him a slave and an idolater. His mind resembled those creepers which the botanists call parasites, and which can subsist only by clinging round the stems and imbibing the juices of stronger plants. He must have fastened himself on somebody. He might have fastened himself on Wilkes, and have become the fiercest patriot in the Bill of Rights Society. He might have fastened himself on Whitfield, and have become the loudest field-preacher among the Calvinistic Methodists. In a happy hour he fastened himself on Johnson. The pair might seem ill-matched. For Johnson had early been prejudiced against Boswell's country. To a man of Johnson's strong understanding and irritable temper, the silly egotism and adulation of Boswell must have been as teasing as the constant buzz of a fly. Johnson hated to be questioned; and Boswell was eternally catechising him on all kinds of subjects, and sometimes propounded such questions as, "What would you do, sir, if you were locked up in a tower with a baby?" Johnson was a water drinker and Boswell was a winebibber, and indeed little better than a habitual sot. It was impossible that there should be perfect harmony between two such companions. Indeed, the great man was sometimes provoked into fits of passion, in which he said things which the small man, during a few hours, seriously resented. Every quarrel, however, was soon made up. During twenty years the disciple continued to worship the master; the master continued to scold the disciple, to sneer at him, and to love him. The two friends ordinarily resided at a great distance from each other. Boswell practiced in the Parliament House of Edinburgh, and could pay only occasional visits to London. During those visits his chief business was to watch Johnson, to discover all Johnson's habits, to turn the conversation to subjects about which Johnson was likely to say something remarkable, and to fill quarto notebooks with minutes of what Johnson had said. In this way were gathered the materials out of which was afterward constructed the most interesting biographical work in the world.

Soon after the club began to exist, Johnson formed a connection less important indeed to his fame, but much more important to his happiness, than his connection with Boswell. Henry Thrale, one of the most opulent brewers in the kingdom, a man of sound and cultivated understanding, rigid principles, and liberal spirit, was married to one of those clever, kind-hearted, engaging, vain, pert young women, who are perpetually doing or saying what is not exactly right, but who, do or say what they may, are always agreeable. In 1765 the

Thrales became acquainted with Johnson, and the acquaintance ripened fast into friendship. Johnson soon had an apartment at the brewery in Southwark, and a still more pleasant apartment at the villa of his friends on Streatham Common. A large part of every year he passed in those abodes, abodes which must have seemed magnificent and luxurious indeed, when compared with the dens in which he had generally been lodged. But his chief pleasures were derived from what the astronomer of his Abyssinian tale called "the endearing elegance of female friendship." Mrs. Thrale rallied him, soothed him, coaxed him, and, if she sometimes provoked him by her flippancy, made ample amends by listening to his reproofs with angelic sweetness of temper. When he was diseased in body and in mind, she was the most tender of nurses. No comfort that wealth could purchase, no contrivance that womanly ingenuity, set to work by womanly compassion, could devise, was wanting to his sick-room. He requited her kindness by an affection pure as the affection of a father, yet delicately tinged with a gallantry which, though awkward, must have been more flattering than the attentions of a crowd of the fools who gloried in the names, now obsolete, of Buck and Maccaroni. It would seem that a full half of Johnson's life during about sixteen years was passed under the roof of the Thrales.

The course of life which has been described was interrupted in Johnson's sixty-fourth year by an important event. He had early read an account of the Hebrides, and had been much interested by learning that there was so near him a land peopled by a race which was still as rude and simple as in the Middle Ages. A wish to become intimately acquainted with a state of society so utterly unlike all that he had ever seen frequently crossed his mind. But it is not probable that his curiosity would have overcome his habitual sluggishness, and his love of the smoke, the mud, and the cries of London, had not Boswell importuned him to attempt the adventure, and offered to be his squire. At length, in August, 1773, Johnson crossed the Highland line, and plunged courageously into what was then considered, by most Englishmen, as a dreary and perilous wilderness. After wandering about two months through the Celtic region, sometimes in rude boats which did not protect him from the rain, and sometimes on small shaggy ponies which could hardly bear his weight, he returned to his old haunts with a mind full of new images and new theories. During the following year he employed himself in recording his adventures. About the beginning of 1775 his *Journey to the Hebrides* was published, and was, during some weeks, the chief subject of conversation in all circles in which any attention was paid to literature. The book is still read with pleasure. Macpherson, whose *Fingal* had been proved in the *Journey* to be an impudent forgery, threatened to take vengeance with a cane. The only effect of this threat was that Johnson reiterated the charge of forgery in the most contemptuous terms, and walked about, during some time, with a cudgel, which, if the imposter had not been too wise to encounter it, would assuredly have descended upon him, to borrow the sublime language of his own epic poem, "like a hammer on the red son of the furnace."

Unhappily, a few months after the appearance of the *Journey to the Hebrides*, Johnson did what none of his envious assailants could have done, and to a certain extent succeeded in writing himself down. The disputes between England and her American colonies had reached a point at which no amicable adjustment was possible. Civil war was evidently impending; and the ministers seem to have thought that the eloquence of Johnson might with advantage be employed to inflame the nation against the opposition at home, and against the rebels beyond the Atlantic. He had already written two or three tracts in defense of the foreign and domestic policy of the government; and those tracts, though hardly worthy of him, were much superior to the crowd of pamphlets which lay on the counters of Almon and Stockdale. But his *Taxation No Tyranny* was a pitiable failure. The very title was a silly phrase, which can have been recommended to his choice by nothing but a jingling alliteration which he ought to have despised. The arguments were such as boys use in debating societies. The pleasantry was as awkward as the gambols of a hippopotamus. Even Boswell was forced to own that in this unfortunate piece he could detect no trace of his master's powers. The general opinion was that the strong faculties which had produced the *Dictionary* and the *Rambler* were beginning to feel the effect of time and of disease, and that the old man would best consult his credit by writing no more.

But this was a great mistake. Johnson had failed, not because his mind was less vigorous than when he wrote *Rasselas* in the evenings of a week, but because he had foolishly chosen, or suffered others to choose for him, a subject such as he would at no time have been competent to treat. He was in no sense a statesman. He never willingly read or thought or talked about affairs of state. He loved biography, literary history, the history of manners; but political history was positively distasteful to him. The question at issue between the colonies and the mother country was a question about which he had really nothing to say. He failed, therefore, as the greatest men must fail when they attempt to do that for which they are unfit—as Burke would have failed if Burke had tried to write comedies like those of Sheridan, as Reynolds would have failed if Reynolds had tried to paint landscapes like those of Wilson. Happily, Johnson soon had an opportunity of proving most signally that his failure was not to be ascribed to intellectual decay.

On Easter eve, 1777, some persons, deputed by a meeting which consisted of forty of the first booksellers in London, called upon him. Though he had some scruples about doing business at that season, he received his visitors with much civility. They came to inform him that a new edition of the English poets, from Cowley downward, was in contemplation, and to ask him to furnish short biographical prefaces. He readily undertook the task, a task for which he was preëminently qualified. His knowledge of the literary history of England since the Restoration was unrivaled. That knowledge he had derived partly from books, and partly from sources which had long been closed; from old Grub Street traditions; from the talk of forgotten poetasters and pamphleteers, who had long been lying in parish vaults; from the recollections of such men as Gilbert Walmesley, who had conversed with the wits of Button, Cibber, who had mutilated the plays of two generations of dramatists, Orrery, who had been admitted to the society of Swift, and Savage, who had rendered services of no very honorable kind to Pope. The biographer therefore sat down to his task with a mind full of matter. He had at first intended to give only a paragraph to every minor poet, and only four or five pages to the greatest name. But the flood of anecdote and criticism overflowed the narrow channel. The work, which was originally meant to consist only of a few sheets, swelled into ten volumes, small volumes, it is true, and not closely printed. The first four appeared in 1779, the remaining six in 1781.

The *Lives of the Poets* are, on the whole, the best of Johnson's works. The narratives are as entertaining as any novel. The remarks on life and on human nature are eminently shrewd and profound. The criticisms are often excellent, and, even when grossly and provokingly unjust, well deserve to be studied.

Among the *Lives* the best are perhaps those of Cowley, Dryden, and Pope. The very worst is, beyond all doubt, that of Gray. This great work at once became popular. There was, indeed, much just and much unjust censure; but even those who were loudest in blame were attracted by the book in spite of themselves.

Johnson was now in his seventy-second year. The infirmities of age were coming fast upon him. That inevitable event of which he never thought without horror was brought near to him; and his whole life was darkened by the shadow of death. The kind and generous Thrale was no more; and it would have been well if his wife had been laid beside him. But she survived to be the laughing-stock of those who had envied her, and to draw from the eyes of the old man who had loved her beyond anything in the world tears far more bitter than he would have shed over her grave. While she was restrained by her husband, a man of sense and firmness, indulgent to her taste in trifles, but always the undisputed master of his house, her worst offenses had been impertinent jokes, white lies, and short fits of pettishness ending in sunny good humor. But he was gone; and she was left an opulent widow of forty, with strong sensibility, volatile fancy, and slender judgment. She soon fell in love with a music-master from Brescia, in whom nobody but herself could discover anything to admire. Conscious that her choice was one which Johnson could not approve, she became desirous to escape from his inspection. Her manner toward him changed. She was sometimes cold and sometimes petulant. She did not conceal her joy when he left Streatham; she never pressed him to return; and, if he came unbidden, she received him in a manner which convinced him that he was no longer a welcome guest. He took the very intelligible hints which she gave. He read for the last time a chapter of the Greek Testament in the library which had been formed by himself. In a solemn and tender prayer he commended the house and its inmates to the Divine protection, and, with emotions which choked his voice and convulsed his powerful frame, left forever that beloved home for the gloomy and desolate house behind Fleet Street, where the few and evil days which still remained to him were to run out. Here, in June, 1783, he had a paralytic stroke, from which, however, he recovered, and which does not appear to have at all impaired his intellectual faculties. But other maladies came thick upon him. His asthma tormented him day and night. Dropsical symptoms made their appearance. While sinking under a complication of diseases, he heard that the woman whose friendship had been the chief happiness of sixteen years of his life had married an Italian fiddler, that all London was crying shame upon her, and that the newspapers and magazines were filled with allusions to the Ephesian matron and the two pictures in *Hamlet*. He vehemently said that he would try to forget her existence. He never uttered her name. Every memorial of her which met his eye he flung into the fire. She meanwhile fled from the laughter and hisses of her countrymen and countrywomen to a land where she was unknown, hastened across Mont Cenis, and learned, while passing a merry Christmas of concerts and lemonade parties at Milan, that the great man with whose name hers is inseparably associated had ceased to exist. Johnson expired on December 13, 1784.

JOHNSTON, Albert Sidney, American soldier, was born in Kentucky in 1803. After graduating at West Point in 1826 he served for eight years in the United States army, emigrated to Texas in 1834, and entered the Texan service as private in 1836. His promotion was so rapid that in 1838 he was appointed commander-in-chief, and till 1840 acted as secretary of war. From 1840 till 1846 he lived in retirement on his farm in Texas; but in the latter year he accepted the colonelcy of a regiment of Texan volunteers to serve against Mexico. As a staff-officer he was present at the battle of Monterey in September, 1846. Texas joined the Union in 1846; and in 1849 Johnston received a major's commission in the United States army. After various services he won the rank of brevet brigadier-general by his skillful conduct of the expedition sent to Utah in 1857 to bring the Mormons to order. In January, 1861, he was transferred from the command of the Texas department to that of the Pacific department; but in April he was superseded, probably on account of his secessionist sympathies. He resigned his national commission in May, 1861, and accepted a command in the Confederate army. While acting as commander-in-chief at the battle of Shiloh, he was killed, April 6, 1862.

JOHNSTON, Alexander Keith (1804–1871), geographer, was born at Kirkhill, near Edinburgh.

JOHNSTONE, a manufacturing town in the county of Renfrew, Scotland, is situated on the Black Cart river, about ten miles west of Glasgow, with which it is connected by rail.

JOHNSTOWN, a town of Cambria county, Penn., is situated on the Stony Creek and the Conemaugh river, 78 miles east of Pittsburgh and 277 miles west of Philadelphia. It is the center of nine contiguous boroughs constituting, in 1900, 35,936 inhabitants, who are mainly employed by the Cambria Iron Company in the manufacture of iron, steel, railway bars, wire, etc. There are large woolen and flouring mills, numerous churches, and a public library. The library building was presented to the Library Association by the Cambria Iron Company. On May 31, 1889, Johnstown was nearly swept out of existence by a terrible inundation caused by the breaking of the dam of an artificial lake situated above the town.

JOHNSTOWN, county seat of Fulton county, N. Y., is situated forty-eight miles from Albany and has good railroad and telegraph facilities. It has extensive manufactures of woolen goods and gloves, and a population in 1900 of 10,130.

JOHNSTOWN, a manufacturing town of Providence county, R. I., has a population (1900) of 4,305.

JOHORE, a native state at the southern end of the Malay or Malacca peninsula, bounded by the Moar river on the northwest and by the Indu on the northeast, with an area of 9,000 square miles, and a pop. of 200,000.

JOIGNY, chief town of an arrondissement in the department of Yonne, France, is situated on the right bank of the Yonne, about twelve miles northwest of Auxerre. Population about 7,000.

JOINERY. See Building.

JOINT, in law, as applied to obligations, estates, etc., implies that the rights in question relate to the aggregate of the parties joined. Obligations to which several are parties may be *several*, *i.e.*, enforceable against each independently of the others, or *joint*, *i.e.*, enforceable only against all of them taken together, or *joint and several*, *i.e.*, enforceable against each or all at the option of the claimant.

JOINTS, in the sense in which engineers use the word, may be classed either according to their material, as in stone or brick, wood, or metal; or according to their object, to prevent leakage of air, steam, or water, or to transmit force, which may be thrust, pull, or shear; or according as they are stationary or moving ("working" in technical language). Many joints, like those of ship-plates and boiler-plates, have simultaneously to fulfil both objects.

JOINT-STOCK COMPANIES. See COMPANY.

JOINVILLE, JEAN DE, was the second great writer of history in Old French, and in a manner occupies the interval between Villehardouin and Froissart. From the point of view of literary history there are numerous minor chroniclers who fill up the gaps, but no one of them has the idiosyncrasy which distinguishes these three writers, and for general purposes it may be said that they complete the series of historians illustrating, as no series in any other country or language illustrates, the three periods of the Middle Ages — adolescence, complete manhood, and decadence. Joinville was born in 1224 of a good family of the province of Champagne, allied to many distinguished houses in the east of France and connected by marriage with the emperor Frederick II. He died July 13, 1319.

JOILET, the county seat of Will county, Ill., is situated on both sides of the Desplaines river, forty miles southwest of Chicago, with which it is connected by three railroads and the Illinois and Michigan canal. The State penitentiary near the city, erected at a cost of over $1,000,000, is one of the largest in the United States. Manufactures of various kinds, especially of iron and steel, barbed-wire fence, agricultural implements and machinery, paper, boots and shoes, cut stone, draining tiles and sewer pipes, are extensively carried on. The coalfields of Wilmington, Morris, and Streator are within a few miles of the city. Quarries of good building-stone, and deposits of fireclay, sand, and cement gravel abound in the neighborhood. Joilet is an important railroad center, from which large quantities of manufactured articles, grain, cattle, and hogs are dispatched daily. Population (1900), 29,353.

JOMINI, HENRY BARON, general in the French and afterward in the Russian service, and writer on military tactics, was born March 6, 1779, at Payerne, in the canton of Vaud, Switzerland, where his father held the dignity of magistrate. At an early period he showed a marked preference for a military life, but at first he was disappointed of his hopes by the dissolution of the Swiss regiments of France at the revolution. For some years he acted as clerk in a banking house in Paris, until the outbreak of the Swiss revolution, when he returned to his native country, and at the early age of nineteen was appointed chief secretary of war. At the peace of Lunéville in 1801 he returned to Paris and introduced himself to Marshal Ney, who made him his aide-de-camp and private secretary. In 1804 he published *Traité des grandes opérations militaires*, which, in 1805, he presented to Napoleon on the field of Austerlitz as the work of a young Swiss officer. A few days afterward he was named colonel, and appointed first aide-de-camp to Marshal Ney. In 1806 he published a treatise on the probabilities of the war with Prussia, the ability of which so impressed Napoleon that he resolved to attach him to his person. He was present with Napoleon at the battle of Jena, but afterward joined Ney, and afforded him important assistance in delivering his army from a very perilous situation. After the peace of Tilsit he was made chief of the staff to Ney, and created a baron. In the Spanish campaign of 1808 his skillful advice contributed in no small degree to the victories of Ney, but on account of that general's jealousy he resigned his commission, and he was entering into negotiations with the emperor of Russia, when Napoleon, learning his intention, compelled him to remain in the French service, with the rank of brigadier-general. On his refusal to take part in the Russian campaign, Napoleon named him governor of Wilna, but during the retreat from Moscow he at once placed his strategic skill and knowledge of the country at the service of France, and, having after the battle of Lützen obtained his old office under Marshal Ney, he suggested the happy maneuver which led to the victory of Bautzen. Finding, however, that the road to promotion was closed against him, he again offered his services to Russia. They were accepted, and he obtained the rank of lieutenant-general and was named aide-de-camp to the emperor. He gave the important assistance of his counsel to the allied armies during the German campaign, but declined to take part in the passage of the Rhine and the invasion of France in 1814. In 1817 he returned to Paris, where he published several works on military matters. In 1826 he again entered the service of Russia, and in the Turkish campaign of 1828 his sagacious advice led to the capitulation of Varna. Afterward he was employed in organizing the military academy at St. Petersburg and in superintending the military studies of the czarowitz. During the later period of his life Jomini resided at Brussels, but he afterward returned to Paris, where he died March 24, 1869.

JOMMELLI, NICCOLÒ (1714-1774), a famous Italian composer of the last century, was born at Aversa, near Naples.

JONAH. The Book of Jonah is so named from the principal personage of the narrative, only mentioned elsewhere in 2 Kings xiv., 25. Jonah there appears as a native of Zebulum, and a contemporary of Jeroboam II., (eighth century B.C.). If the book of Jonah were written then, it has a claim to rank as the oldest of the prophetic writings (Joel being in all probability of post-exile origin). The problems connected with this little book, are however, so great that no judicious critic would think of admitting such a date as proved.

JONAH, RABBI, of Cordova, the most eminent Jewish grammarian and lexicographer of the Middle Ages, known also among Hebrew authors as R. Merinos (Marinus), but now usually called by his Arabic name, Abu 'l Walíd Merwán ibn Janáh, was born at Cordova toward the close of the tenth century.

JONAS, JUSTUS (1493-1555), a German Protestant Reformer, was born at Nordhausen in Thuringia.

JONES, INIGO, an English architect, sometimes called the "English Palladio," was the son of a cloth-worker, and was born in London about 1572. It is stated that he became apprenticed to a joiner, but at any rate his talent for drawing attracted somehow the attention of a nobleman, by some affirmed to have been the earl of Arundel, by others the earl of Pembroke, who sent him to study landscape-painting in Italy. His preference soon transferred itself to architecture, and, following chiefly the style of Palladio, he acquired at Venice such considerable reputation that in 1604 he was invited by Christian IV. to Denmark, where he is said to have designed the two great royal palaces of Rosenborg and Frederiksborg. In the following year he accompanied Anne of Denmark to the court of James I. of England, where, besides being appointed architect to the queen and Prince Henry, he was employed in supplying the designs and decorations of the court masques. After a second visit to Italy in 1612, Jones was appointed surveyor-general of the royal buildings by James I., and was engaged to prepare designs for a new palace at Whitehall. In 1620 he was employed by the king to investigate the origin of Stonehenge, when he came to the absurd conclusion that it had been a Roman temple. Shortly afterward he was appointed one of the commissioners for the repair of St. Paul's, but the work was not begun till 1633. Under Charles I. he enjoyed the same offices as under his predecessor, and in the capacity of designer of the masques he came into collision with Ben Jonson, who on this account has frequently made him the butt of his satire. After the civil war Jones was forced to pay heavy fines as a courtier and malignant. He died in poverty, July 5, 1651.

JONES, JOHN PAUL, was born July 6, 1747, at Kirkcudbright, Scotland, where his father, John Paul, was gardener. At twelve he went to sea as apprentice to a merchant of Whitehaven, in whose ships he visited America several times. He became a skillful sailor, and was for some time mate of a slaver in the West Indies. On his way back to England, after leaving the slave trade in disgust, the captain and mate of the ship in which he was both died; and the skillful manner in which Paul Jones brought the ship safely into port induced the owners to appoint him captain. In 1773, having for some unknown reason assumed the cognomen of Jones, he settled in Virginia, on a property which had fallen to him on the death of an older brother. When the American war of independence broke out two years later, Jones took up arms for the colonies, and accepted a command in the navy of the new republic. He did good service against his native land, and in 1777 was sent to France to receive a more important command. Disappointed in that, he sailed in 1778 to the English coast in his ship *Ranger*, and availed himself of his early knowledge to land at Whitehaven, where, however, he was unsuccessful in his attempt to fire the shipping. Next year he sailed on a similar expedition in the *Bonhomme Richard*, along with other vessels, and, steering up the Firth of Forth, was only prevented by a strong westerly gale from attacking Leith. On his way south again he fell in, off Flamborough Head, with the English ship *Serapis*, which after a long and bloody combat he compelled to strike. That exploit raised his fame to its acme. On his return to Paris he was fêted and caressed by the best society; and Louis XVI. presented him with a gold-hilted sword, and decorated him with the military Order of Merit. After some time spent in America, where he was much chagrined by the neglect that met his repeated requests for further employment, Paul Jones returned to Paris as agent for all prizes taken in Europe under his own command. A favorable report to Congress as to his naval services was followed by a vote of a gold medal from that body in 1786. In 1788 the Chevalier Jones entered the service of the empress Catherine of Russia, and became as enthusiastic a Russian as he had been an American. He was appointed to a command in the Black Sea, with the rank of rear-admiral, to act against the Turks; but the jealousy and rivalry of the Russian commanders brought about his recall in less than eight months. Summoned to St. Petersburg, on pretext of receiving a post in the North Sea, he was left in restless idleness, until at last two years' formal leave of absence was granted him. On this virtual dismissal, Paul Jones retired to Paris, soured and disappointed; and after two years spent in fruitlessly importuning the Russian court, he died in that city on July 18, 1792.

In the summer of 1905, his unmarked grave was found in an old and neglected cemetery in Paris. His body was exhumed and returned with military honors to the land of his adoption

JONES, OWEN, architect, and art-decorator, son of the subject of last notice, was born in London in 1809, and he traveled for four years in Italy, Greece, Turkey, Egypt, and Spain, making a special study of the Alhambra in the last-mentioned country. On his return to England in 1836 he busied himself in his professional work. He was one of the superintendents of works for the Exhibition of 1851; and, as director of decorations for the Crystal Palace at Sydenham, he arranged the Egyptian, Greek, Roman, and Alhambra courts, besides being responsible for the general decoration of the whole building. Along with Mr. (afterward Sir Digby) Wyatt, Jones collected the casts of works of arts on the Continent which adorn the different courts. In his later years he was much engaged in the decoration of private houses, among which may be reckoned the viceroy of Egypt's palace at Gesch. In 1857 he received the royal medal for architecture; and after other distinctions, he was awarded a diploma of honor at the Vienna Exhibition of 1873. He died in London, April 19, 1874.

JONES, SIR WILLIAM, one of the most accomplished linguists and Oriental scholars that England has produced, was born in London, September 28, 1746. When seven years old he was sent to Harrow, where he soon far excelled all his schoolfellows in every branch of study. But the classical routine of a public school failed to satisfy the ardent thirst for knowledge displayed by the boy from his earliest childhood. He accordingly began to apply himself, during the last three years of his life at Harrow, to the study of Oriental languages, teaching himself the rudiments of Arabic, and becoming sufficiently familiar with Hebrew to be able to read that language with tolerable ease. The greater part of his vacations he devoted to the improvement of his acquaintance with French and Italian by assiduously practicing composition in those tongues. In 1764 young Jones went to Oxford and entered University College, where he continued to prosecute his studies with unabated vigor. Though obliged to give up a considerable portion of his time to the classical studies required by the university course, he still directed his attention chiefly to Oriental literature, particularly to Persian and Arabic. In acquiring the latter language he received effective assistance from a Syrian named Mirza, whom he discovered in London and brought with him to Oxford. Meanwhile, however, not content with all this work, he managed to make considerable progress in Italian, Spanish, and Portuguese. In 1766 Jones obtained a fellowship, which placed him in a position of independence, and enabled him to give his undivided attention to his linguistic pursuits. On his return from a short visit to the Continent, where he picked up some knowledge of German, he began the study of Chinese, and made himself master of the radical characters of that language. Though not more than twenty-two years of age, he was already becoming famous for his acquirements as a linguist and Oriental scholar. Accordingly, when Christian VII., king of Denmark, visited England in 1768, bringing with him a life of Nadir Shah in Persian, Jones was requested to render the MSS. into French. He agreed, and the translation appeared in 1770, with an introduction containing a description of Asia, and a short history of Persia (2 vols. 8vo; new ed. 1790). This was followed in the same year by a treatise in French on Oriental poetry, and by a metrical translation, in the same language, of the odes of Hafiz.

For some time Jones had been thinking of taking up the law as a profession, and, having now finally decided on doing so, he became a member of the Temple. In 1771 appeared his grammar of the Persian language (9th ed., with corrections and additions by Samuel Lee, D.D., Lond., 1828), which is still considered one of the best textbooks on the subject. In 1772 Jones published a small volume of poems, chiefly translations from Asiatic languages, together with two elegant essays on the poetry of Eastern nations and on the arts commonly called imitative. His next publication, which appeared in 1774, was a treatise entitled *Poeseos Asiaticæ commentariorum libri sex*, the chief aim of which was to familiarize the European mind with the genius of Oriental poetry.

Being now admitted to the bar, Jones determined to give up all his energies to his legal studies, and renounced polite literature for some years.

In the winter of 1780–81 he found leisure to complete his translation of the seven ancient Arabic poems called *Moallakât.* Besides writing an *Essay on the Law of Bailments*, Jones translated in 1781 the speeches of Isæus on the right of inheritance, and an Arabian poem on the Mahometan law of succession to the property of intestates, as bearing on his legal studies.

The hopes which he had for some time entertained of obtaining a seat on the judicial bench in Bengal were at last gratified on the accession to power of the Shelburne administration, by which he was in 1783 appointed a judge of the supreme court of judicature at Fort William, at the same time receiving the honor of knighthood. Shortly after his arrival in Calcutta he founded, in January, 1784, the Asiatic Society, of which he remained president until his death. Convinced as he was of the great importance of consulting the Hindu legal authorities in the original, he lost no time in commencing the study of Sanskrit. Having in a few years made himself complete master of the language, he undertook, in 1788, the task of compiling a digest of Hindu and Mahometan law, the completion of which he did not live to see; the work was finished, however, by Colebrooke, who edited it at Calcutta in 1800 under the title of *Digest of Hindu Laws.* In 1789 Sir William Jones published the first volume of *Asiatic Researches* and his translation of *Sakuntalâ*, the most famous play of Kâlidâsa, the greatest Indian dramatist. He also translated the well-known collection of fables entitled the *Hitopadeça*, the *Gîtagovinda*, an erotic poem by Jayadeva, and considerable portions of the Veda, besides editing the text of the *Ritusamhâra*, a short but celebrated poem by Kâlidâsa. His last work, which appeared in 1794, was the translation of the *Institutes of Manu*, a compilation of laws and ordinances, dating from the fifth century B.C. Sir William's unremitting literary labors, together with the conscientious performance of his heavy judicial work, could not fail to tell on his health after a ten years' residence in the climate of Bengal; and he was about to return to England when a sudden attack of inflammation of the liver carried him off, in the forty-eighth year of his age (April 27, 1794).

JONES, WILLIAM (1726–1800), a divine of the Church of England, and one of the principal followers of John Hutchinson, was born at Lowick, Northamptonshire.

JONKÖPING, a town of Sweden, at the head of the län of the same name, about 170 miles southwest of Stockholm, and eighty east of Gothenburg. It is well known as the seat of a great safety-match factory, which produced in 1860 upward of 35,000,000 boxes. It also contains snuff and cigar factories, an asphalt factory, dyeworks, damask factories, and a variety of minor establishments. The population, which has been steadily increasing, numbered (1900) 23,143.

JONSON, BEN (for thus his Christian name was usually abbreviated by himself and his contemporaries, and thus, in accordance with his famous epitaph, it will always continue to be abbreviated by posterity), was born about the beginning of the year 1573. Jonson's stepfather was a master bricklayer in or near Westminster, who—whether or not he afterward constrained his stepson, while acquainting himself with the business into which he had been admitted, to undergo the degradation of laying a few bricks with his own trowel—certainly allowed him to lay for himself the foundations of a good education. After attending a private school in the neighborhood, he was sent to Westminster school—nor is it at all obvious why the master bricklayer should have been denied the credit of having sent him there. Jonson's gratitude, however, for an education to which in truth he owed an almost inestimable debt, concentrated itself upon the "most reverend head" of the illustrious Camden, then second and afterward head master of the famous school, and the firm friend of his pupil in later life.

After reaching the highest form at Westminster, Jonson is stated, but on unsatisfactory evidence, to have proceeded to the university of Cambridge. He soon had enough of it, and was soldiering in the Netherlands, much to his own subsequent satisfaction when the days of self-conscious retrospect arrived, but to no further purpose beyond that of seeing something of the world. By the middle of 1597 we at last come across documentary evidence of him at home in London in the shape of an entry in Henslowe's diary, on July 28th, of 3s. 6d. "received of Bengemenes Johnsones share." He was therefore by this time, when Shakespeare, his senior by nearly nine years, was already in prosperous circumstances and good esteem, at least a regular member of the profession, with a fixed engagement in the Lord Admiral's company, then performing under the experienced Henslowe's management at the Rose. The traditions may very possibly be true, according to which he had previously acted at the Curtain (a former house of the Lord Admiral's men), and "taken mad Jeronimo's part" as a stroller. This latter appearance would in that case have probably been in *The Spanish Tragedy*, since in *The First Part of Jeronimo* Jonson would have had to dwell on the "smallness" of his "bulk." He was at a subsequent date (1601) employed by Henslowe to write up *The Spanish Tragedy*, in pursuance of a fashion differing from that of later times, when old plays have more usually been written *down* to the taste of modern audiences. Jonson's additions, which were not the first changes made in the play, are usually supposed to be those printed with *The Spanish Tragedy* in the edition of 1602; Charles Lamb's doubts on the subject are an instance of that subjective kind of criticism in which it is unsafe to put absolute trust.

Ben Jonson may be supposed to have married two or three years before the date of Henslowe's first entry of his name. Of his wife he afterward spoke with scant enthusiasm, and for one (undated) interval of five years he preferred to live without her. Long burnings of "oil" among his books, and long spells of recreation at the tavern, such as Jonson loved, are not the most favored accompaniments of family life. But Jonson was no stranger to the tenderest of affections; two at least of the several children whom his wife bore to him he commemorated in touching little tributes of verse; nor in speaking of his lost eldest daughter did he forget "her mother's tears."

Within a year's time, or little more, from the date at which we first find Ben Jonson in well-authenticated connection with the English stage, he had produced one of the most memorable plays in its history. *Every Man in his Humor*, the original example of a species of English comedy which cannot be said to have become altogether extinct even with the Restoration, was first acted in 1598—probably in the earlier part of September—by the Lord Chamberlain's company, which was then still performing at the so-called Theater, and in which Shakespeare was just on the eve of acquiring one or more shares. He certainly was one of the actors in Jonson's comedy, and it is in the character of "Old Knowell" in this very play that, according to a bold but ingenious guess, Shakespeare is represented in the half-length portrait of him in the folio of 1623, beneath which were printed Jonson's lines concerning the picture. *Every Man in his Humor* was probably followed by *The Case is Altered*, which was certainly acted by 1599, and which contains a satirical attack upon the pageant poet Anthony Munday. Inasmuch as the earlier of these two comedies was indisputably successful, and as Jonson's reputation was already sufficient to insure him a mention in the *Paladis Tamia* of Francis Meres, published in the same year, 1598, as one of the chief writers in tragedy (on the strength of what play or plays is unknown), it was an awkward fatality that before the year was out he should have found himself in prison and in danger of the gallows. He had had the misfortune of killing in a duel, fought in Hogsden Fields, for some cause unknown, an actor of Henslowe's company named Gabriel Spenser; possibly Henslowe's uncourteous designation of Jonson as a "bricklayer" may imply that the success of the new comedy at the other house had not been a subject of congratulation at that to which its author had formerly belonged. In prison Jonson was visited by a Roman Catholic priest—a prison being the most likely place in which to meet a priest in those days; and the result was his conversion to the Church of Rome, to which he adhered for twelve years. Jonson was afterward a diligent student of divinity; but, though his mind was religious, it is not probable that its natural bias much inclined it to dwell upon creeds and their controversies. Though in prison spies were set upon him, which was then thought to be an admirable method for expediting justice, yet his judges (he afterward boasted) could get nothing out of him but "aye" or "no." And thus after a short imprisonment he was released, some time early in 1599, in which year he is found back again at work for Henslowe, receiving, together with Dekker, Chettle, and "another gentleman," earnest-money for a tragedy called *Robert II., King of Scots*. It is of more importance that in the same year he brought out through the Lord Chamberlain's company (possibly already at the Globe, then newly built or building) the elaborate comedy of *Every Man out of his Humor*—a work which subsequently had the honor, for which it was in some respects specially fitted, of being presented before Queen Elizabeth.

In the year which dates the tragedy concerning the fall of the great favorite, there began a reign in England destined to be remembered as that of favorites hardly less hated than he. Adulatory loyalty seemed intent on showing that it had not exhausted itself at the feet of Gloriana, and Jonson's well-stored brain and ready pen had their share in devising and executing ingenious variations on the theme "Welcome—since we cannot do without thee!" The pageant which on May 7, 1603, bade the king welcome to a capital dissolved in joy was partly of Jonson's partly of Dekker's devising; and, having thus been prominently brought into notice, he was able to deepen and diversify the impression by the composition of masks presented to James I. when entertained at houses of the nobility. He was soon occasionally employed by the court itself—already in 1606 in conjunction with Inigo Jones as responsible for the "painting and carpentry"—and thus speedily showed himself master in a species of composition to which he, more than any other of our poets before Milton, secured an enduring place in the national poetic literature.

His powers as a dramatist were at their height during the earlier half of the reign of James I.; and by the year 1616 he had produced nearly all the plays which are worthy of his genius. They include the tragedy of *Catiline* (1611), which achieved only a doubtful success, and the comedies of *Volpone* or *The Fox* (acted 1605), *Epicœne* or *The Silent Woman* (1609), the *Alchemist* (1610), *Bartholomew Fair* (1614), and *The Devil is an Ass* (1616). During the same period he produced several masks, usually in connection with Inigo Jones, with whom, however, he seems to have quarreled already in this reign, though it is very doubtful whether the architect is really intended to be ridiculed in *Bartholomew Fair* under the character of "Lanthorn Leatherhead." In 1616 a modest pension of 100 marks a year was conferred upon him; and possibly this mark of royal favor may have encouraged him to the publication of the first volume of the folio collected edition of his works (1616).

He had other patrons more bountiful than the crown, and for a brief space of time (in 1613) had traveled to France as governor to the eldest son of Sir Walter Raleigh. By the year 1616 Jonson seems to have made up his mind to cease writing for the stage, where neither his success nor his profits had equaled his merits and expectations. He continued to produce masques and entertainments when called upon; but he was attracted by many other literary pursuits, and had already accomplished enough to furnish plentiful materials for retrospective discourse over pipe or cup.

It was in the year 1618 that Ben Jonson, like his great namesake a century and a half afterward, resolved to have a real holiday for once, and about midsummer started for his ancestral country, Scotland. He had (very heroically for a man of his habits) determined to make the journey on foot; and—imitation is the sincerest kind of flattery—was speedily followed by John Taylor, the water-poet, who still further handicapped himself by the condition that he would accomplish the pilgrimage without a penny in his pocket. Jonson (who put money in his good friend's purse when he came up with him at Leith) spent more than a year and a half in the hospitable Lowlands, being solemnly elected a burgess of Edinburgh, and on another occasion entertained at a public banquet there. But the best remembered hospitality which he enjoyed was that of the learned and refined Scottish poet Drummond of Hawthornden, to which we owe the so-called *Conversations*.

After his return to England Jonson appears to have resumed his former course of life. In 1619 his visits to the country-seats of the nobility were varied by a sojourn at Oxford with Corbet at Christ Church, on which occasion a master's degree was conferred upon him by the university. He confessed about this time that he was or seemed growing "restive," *i.e.*, lazy, though it was not long before he returned to the occasional composition of masques. He was the acknowledged chief of English literature, both at the festive meetings where he ruled the roost among the younger authors whose pride it was to be "sealed of the tribe of Ben," and by the avowal of grave writers, old or young, not one of whom would have ventured to dispute his preëminence. Nor was he to the last unconscious of the claims upon him which his position brought with it. When death came upon him on August 6, 1637, he left behind him an unfinished work of great beauty, the pastoral drama of *The Sad Shepherd*. For forty years, he said in the prologue, he had feasted the public; at first he could scarce hit its taste, but patience had at last enabled it to identify itself with the working of his pen.

JOPLIN, a flourishing city of Jasper county, Mo., chiefly engaged in smelting lead and zinc, of which very large quantities are turned out annually. Population (1900), 26,023.

JOPPA, the Greek Iope, Hebrew Japho, and Arabic Yáfá, incorrectly written Jaffa, an ancient seaport of Palestine. It is mentioned in the lists of Thothmes III., and in an inscription of Sennacherib, but in the Bible probably in no writing older than the exile. After the exile it was the harbor of Judæa, and as such appears as an important point in the Maccabee wars, when it was fortified by Simon. Strabo and Josephus speak of it as a haunt of pirates, and, on this account, it was destroyed by Vespasian in the Jewish war. The small bay south of the town, called *Birket el Kamr* ("Moonpool"), is possibly the old harbor, the present one being formed by a reef having a broad entrance on the northwest, and a narrow passage in the middle. The coast being quite straight and unsheltered, the port possesses neither natural nor artificial advantages. In the fifth, sixth, and eleventh centuries bishops of Joppa are noticed, under the metropolitan of Jerusalem. In 1187 Saladin took the town, which was recovered by King Richard in 1191, and retaken by Malek el 'Adil in 1196. In 1799 Napoleon stormed the city, then protected by walls. The modern town, the seaport of Jerusalem, with which it is connected by a carriage road in very bad repair, is built on a rounded hillock rising 100 feet above the shore. It contains English, French, German, and American consulates, and Latin and Greek monasteries. The trade consists of wheat, sesame, oranges and other fruit, olives, and soap; the population is stated at 8,000, the majority being Moslems. A German colony, established in 1869, has built two villages, one just outside the town on the northeast, the second (Sarona) at a distance of two miles. The colonists number about 300.

JORDAENS, Jacob (1593–1678), painter, was born at Antwerp.

JORDAN, the principal river of Palestine. The historical source of this famous stream is the cave at Bániás (Cæsarea Philippi), while the stream from Dan (Tell el Kády) is called Lesser Jordan by Josephus, although the larger of the two springs at the Tell is probably the largest fountain in Syria. A third affluent, which has a better geographical claim to be considered the true Jordan, is the Nahr Hasbâny, rising near Hasbeiya on Hermon. The stream from Bániás joins that from Tell el Kady after a course of five miles, descending by cascades through thickets and canebrakes, and a little lower down the Nahr Hasbâny, after a course of fifteen miles, joins the united stream from the other sources. The Bániás source is about 1000 feet above the Mediterranean, and, after passing through the papyrus swamps, the river reaches the Húleh Lake (Merom or Semechonitis), falling 1000 feet in twelve miles. The Huleh is four miles long, and thence to the Sea of Galilee is ten and one-half miles, with a fall of 682 feet. The second lake (see Galilee) is twelve and one-half miles long. The fall of the river after leaving it is at first forty feet per mile, but on entering the plain of Beisán it becomes only ten or twelve feet per mile, and further south only four or five feet. The total length from Bániás to the Dead Sea is 104 miles direct, and, as the level of the Dead Sea is 1,292.5 below the Mediterranean, the total fall is nearly 2,300 feet. The Ghór, or valley of Jordan south of the Sea of Galilee varies in width from four to fourteen miles east and west; the course of the river is extremely tortuous, and it is hidden by a dense jungle of cane, willow, and tamarisk, growing on the water's edge in the sunken channel called Zór, which is about a mile wide, with steep banks of white marl, 50 to 100 feet high. For the last few miles the stream is free from jungle, flowing through a muddy flat. The average width is from thirty to fifty yards, but in February the river "overflows its banks" and fills the Zór. The Arabs enumerate some forty fords, mostly passable in summer only.

JORDAN, Camille (1771–1821), French politician, was born in Lyons. He actively supported by voice, pen, and musket his native town in its resistance to the Convention; and when Lyons fell, in October, 1793, Jordan fled. From Switzerland he passed in six months to England, where he formed acquaintances with other French exiles and with prominent British statesmen, and imbibed a lasting admiration for the English constitution. In 1796 he returned to France, and next year he was sent by Lyons as a deputy to the council of five hundred. Jordan would have been one of the victims of the *coup d'état* of the eighteenth Fructidor (September 4, 1797) had he not escaped to Basel. Thence he went to Germany, where he met Goethe, and probably laid the foundation of his affection for German literature, especially as represented by Klopstock. Back again in France by 1800, he boldly published in 1802 his *Vrai Sens du Vote National pour le Consulat à Vie*, in which he exposed the ambitious schemes of the First Consul. He was unmolested, however, and during the first empire lived in literary retirement at Lyons with his wife and family. At the Restoration in 1814 he again emerged into public life. By Louis XVIII. he was ennobled and named a councilor of state; and from 1816 he sat in the chamber of deputies as representative of Ain. At first he supported the ministry, but when they began to show signs of reaction he separated from them, and gradually came to be at the head of the constitutional opposition. He died May 19, 1821.

JORDANES, or Jornandes, the historian of the Gothic nation, flourished about the middle of the sixth century of the Christian era. All that we certainly know about his life is contained in three sentences of his history of the Goths.

JORTIN, John (1698–1770), a writer on theological subjects, was the son of a Protestant refugee from Brittany, and was born in London.

JOSEPH, the most powerful tribe of northern Israel, occupied the center of the land from the plain of Esdraelon to the mountain country of Benjamin, and threw out colonies to Bashan and northern Gilead. Unlike the other sons of Jacob, Joseph is usually reckoned as two tribes, the younger but more numerous tribe of Ephraim, to which Joshua belonged, having the preëminence over the other—Manasseh. In Ephraim lay the city of Shechem with the tomb of the tribal ancestor, and the great sanctuary of Shiloh where the ark stood until the battle of Ebenezer destroyed for a time the hegemony of Joseph, till after the divisions of the kingdoms he again became "the crowned one of his brethren." Along with the small tribe of Benjamin, which, as its name indicates, lay immediately to the south, the house of Joseph constituted the group known as sons of Rachel (the ewe), which with the sons of Leah (the antelope) claimed a higher ancestry than the other Hebrews (the sons of Jacob's concubines).

The history of Joseph in Egypt displays remarkable familiarity with the circumstances and usages of that country, but presents no data which enable us with certainty to combine the Biblical record with known events in Egyptian history. The name of Joseph was common among the later Jews; of the Biblical personages by whom it was borne the best known are Joseph the husband of Mary, Joseph of Arimathæa, Joseph Barnabas, and Joseph Barsabas.

JOSEPH, the husband of Mary the mother of Jesus, was a descendant of the house of David, and followed the trade of a carpenter in the village of Nazareth. Of his personal history practically nothing is recorded in Scripture. It is probable that he had died before the beginning of the public ministry of Christ; at least this seems a fair inference from the fact that no mention of him is made in passages relating to this period where the mother and brethren of Jesus are introduced.

JOSEPH I., Holy Roman emperor, was born in Vienna, July 26, 1678. In 1689 he received the crown of Hungary, in 1690 that of the king of the Romans; and in 1705 he succeeded his father, Leopold I., as Holy Roman emperor. The war of the Spanish succession was raging at the time of his accession to the imperial throne; and it continued during the whole of his reign. Thanks to the genius of Marlborough and Eugene, Joseph was able to maintain in this struggle the greatest military traditions of the empire; and, the French troops having been gradually driven out of Italy and the Netherlands, Louis XIV. was compelled to ask several times for the conclusion of peace. The pope also gave evidence of the emperor's power by recognizing his brother Charles as king of Spain. In 1706 the electors of Cologne and Bavaria, and in 1708 the duke of Mantua, were put to the ban of the empire for supporting the enemy of their sovereign; and the emperor not only seized Bavaria, but began to partition it. He was successful, too, in Hungary, where he put down a rebellion that had broken out in the time of his father. On the other hand, he found it prudent to manifest a conciliatory spirit in his relations to Charles XII. of Sweden, who in 1706 made his way from Poland to Saxony through Silesia. In 1707 the emperor concluded treaties with him, granting religious liberty to the Silesian Protestants, and restoring to them upward of two hundred churches which had been seized by the Jesuits. These concessions were not unwillingly made by the emperor, who, although a sincere Catholic, was of a tolerant disposition. He showed his respect for the constitution and dignity of the empire by supporting the diet in the free exercise of its functions, by promoting the activity of the imperial chamber, and by restoring Donauwörth, which had been mediatized by Bavaria, to the position of a free imperial city. He died of smallpox on April 17, 1711.

JOSEPH II., Holy Roman emperor, born in Vienna, March 13, 1741, was the son of the emperor Francis I. and Maria Theresa. He was made king of the Romans in 1764; and, in 1765, he succeeded his father as Holy Roman emperor. Maria Theresa declared him co-regent of her hereditary states, but almost all real power she retained in her own hands. He received full authority only in the regulation of the military system, into which he introduced many changes, following in the main the example of Frederick the Great. Chiefly by his advice Maria Theresa was induced to associate herself with Russia and Prussia in the partition of Poland; and, in 1777, he persuaded her to force Turkey to surrender Bukowina. When the younger branch of the house of Wittelsbach died out, in 1777, Joseph claimed a large part of its territory; but Frederick the Great resisted his pretensions, and, in 1779, after a nominal war, the emperor accepted the treaty of Teschen, by which he obtained only a small concession. In 1769 he visited Frederick the Great, for whom he had at that time a warm admiration; and in the following year Frederick returned the visit, going back to Prussia with the conviction that it would be necessary "to keep his eye on that young man." On the death of Maria Theresa, in 1780, Joseph became sole ruler of the Austrian states. He was penetrated by the characteristic ideas of the eighteenth century as to the duties of an absolute monarch, and began at once to give effect to them in a fearless and almost revolutionary spirit. His first step was to combine the various nationalities subject to him into a single state, with thirteen administrative districts. He refused to be crowned king of Hungary, and would not summon the Hungarian diet, insisting that the country should be governed as a province, and causing German to be used as the official language. Among other reforms he proclaimed the abolition of serfdom, substituted various punishments for the capital penalty, established common tribunals, and issued new codes, based on the principle that all citizens are equal before the law. He transferred the censorship of books from the clergy to laymen of liberal sympathies, and granted complete freedom to journalism. He instituted public libraries and observatories, founded a medical college in Vienna, a university in Lemberg, and schools for the middle classes in various parts of the monarchy, and encouraged art by offering prizes in connection with the academy of the plastic arts. Industry and trade he fostered by destroying many monopolies, by aiding in the establishment of new manufactures, by raising Fiume to the position of a free harbor, and by opening the Danube to his subjects from its source to the Black Sea. His ecclesiastical policy was of so bold a character that Pope Pius VI. went to Vienna for the purpose of expostulating with him, but found that the emperor was beyond the range of his influence. The hierarchy was forbidden to correspond with the Roman see without express permission, and papal bulls were subjected to the *Placetum Regium*. In 1781 he issued an edict of toleration, granting freedom of worship to all Protestants and to members of the Greek Church; and between 1782 and 1790 about seven hundred monasteries were closed, the members of religious orders being reduced from 63,000 to 27,000. The Hungarians bitterly resented the suppression of their ancient privileges, and, in 1787, the emperor's new institutions led in several districts to a furious conflict between the peasantry and the nobles. The estates of the Austrian Netherlands persistently opposed the execution of his schemes, the clergy being especially active in stirring up popular indignation; and when, in 1789, he altogether destroyed their constitution, they rebelled and were able for some months to maintain their independence. In Hungary there was so dangerous an agitation that, in January, 1790, Joseph had to undo almost everything he had attempted to accomplish in that country during the previous nine years; he succeeded only in maintaining the decrees by which he had abolished serfdom and established toleration. Thus his last days were rendered miserable by the conviction that his career had been a failure. He was not more fortunate in his foreign policy than in his home government. Early in his reign, indeed, he gained some advantages over the Dutch, who were obliged to abandon their fortresses on the frontier of the Austrian Netherlands. And when they refused to open the Scheldt, they had to compensate him (in 1785) by a payment of 10,000,000 florins. In the same year he renewed his claims on Bavarian territory, but was thwarted by Frederick the Great, who formed his famous league of princes for the protection of the German states against Austrian ambition. After the conclusion of the treaty of Teschen, Joseph made it one of the chief objects of his foreign policy to form an enduring alliance between Austria and Russia; and, in 1788, in association with Catherine II., he declared war against Turkey. He did not live to see the end of this war, which brought him little honor. On February 20, 1790, he died.

JOSÉPHINE, empress of the French, was born at Trois-Ilets, Martinique, on June 23, 1763, and was the eldest of three daughters born to Joseph Tascher de la Pagerie, lieutenant in the artillery, and his wife, Rose-Claire Des Vergers de Sannois. She was educated at a local convent, from which she was withdrawn in her fifteenth year, knowing how to dance, sing, and embroider, but little else. An aunt, resident in

France, was godmother to the second son of the Marquis de Beauharnais, once the governor of Martinique; and she suggested a marriage between her god-child and niece. After much negotiation between the families, in which the second and youngest daughters were both preferred to Joséphine, her father carried her to Havre in 1779, she being already described to her aunt and the Beauharnais as possessing a fine complexion, beautiful arms and eyes, and with a sweet voice and a remarkable taste for music. On December 13th she was married to the Vicomte Alexandre Beauharnais at Noisy-le-Grand. Her son, Eugène, was born at a time when her relations with her husband were embittered by jealousy; and after the birth of her daughter, Hortense-Eugénie, he sought a separation, but, though he carried his request to the parliament, his petition was dismissed. Joséphine went back to her parents in June, 1788, and was with them when the Revolution broke out. At the request of the vicomte she returned, however, to France in 1790. He was then a member of the constituent assembly, receiving at his house the chiefs of the constitutional party; and Joséphine was admired by all of them for her dignity, simplicity, and sweetness. As the crisis became more acute, her husband thought it prudent to withdraw to Ferté-Beauharnais, in Sologne, where he left his family when he went to command the army of the Rhine. After his execution by order of the Convention, Joséphine was reduced to great straits, and not till the end of 1795 did regular remittances from Martinique begin again. She was living in the Rue Chautereine, Paris, in a house of her own, when she paid her first visit to Napoleon to thank him for restoring the sword of her husband. She was in the full flower of her womanhood; Napoleon was at once drawn to her; on March 9, 1796, they were married. In twelve days he left her to take command of the army in Italy; but in June, at his earnest request, she joined him at Milan and went on to Brescia. After the peace of Léoben they lived at Montebello near Milan, and Joséphine was for some time the queen of a court frequented by great officers and diplomatists. Having visited Rome, she went back to Paris, and at her house assembled the most distinguished men of the day. During the expedition to Egypt she moved between the capital and Plombières; but she had her first quarrel with Napoleon on his return, because, by an oversight, she omitted meeting him. Social duties of the most brilliant and difficult sort began to accumulate round her during the consulate. At the palace of the Luxembourg and the Tuileries her drawing-room was again the center of attraction in Paris; her receptions were ruled by the old traditions of regal ceremony, and there was an endless round of fêtes, entertainments, and plays. Her beauty and amiability won upon everybody; and when she wanted rest she retired to Malmaison, a country-seat she had bought, and amused herself with a variety of light studies in botany and natural history. Rumors now began to reach her that Napoleon, in despair of offspring, meant to sue for a divorce. She had long known that his relatives were trying to undermine her position; and even when she knelt beside him at Notre Dame, and received the triple unction at the ceremony which crowned her empress, she knew it to be a concession wrung from him. After the coronation he gave her less and less of his society. It was not, however, until the winter of 1809, that he deliberately proposed to dissolve the connection. He divorced her with much show of tenderness, and she retired to Malmaison with an annual grant of 2,000,000 francs for her establishment. Her affection for Napoleon, and her anxiety for his success, remained strong to the hour of her death, on May 24, 1814.

JOSEPHUS, Flavius, the well-known historian of the Jews, was born at Jerusalem in the first year of the reign of Caligula; the precise date is uncertain, but it lies somewhere between September 13, 37, and March 16, 38 A.D. His early advantages were very considerable. His father, Matthias, belonged to one of the best priestly families in the city, while on his mother's side he was descended from Jonathan, the first Hasmonean high priest. At sixteen he resolved upon an experimental study of the doctrines of the three leading sects, or schools of philosophy, as he prefers to consider them; and, hearing that Banus, a celebrated Essene, was living in the wilderness with the rigorous asceticism of a hermit, he joined him and remained under his teaching for three years. Returning to Jerusalem at the age of nineteen, he definitely joined the Pharisees, to whom he continued ever after to adhere. In 64 A.D. he undertook a journey to Rome to intercede for some priests of his acquaintance whom Felix the procurator had sent thither as prisoners to be tried on some trifling charges. Landing safely at Puteoli after a narrow escape from death by shipwreck in the Adriatic, he gained the friendship of Alityrus, a famous Jewish mime of the day, and a favorite of Nero; by this means he not only obtained the pardon of his friends, but was also loaded with many valuable gifts by the empress Poppæa. On reaching Judæa again he found his countrymen bent at all hazards on throwing off the Roman yoke; knowing well the resources of Rome, and the hopelessness of successfully resisting her power, he (according to his own account, which is not in itself very improbable) did his best to dissuade them from any such attempt. Ultimately, however, after the victory over Cestius Gallus, he yielded to the force of the current, and joined the revolutionary movement in 66, being intrusted with the task of governing and defending the province of Galilee, an appointment for which he was indebted to family influence rather than to any known military skill. Proceeding at once to his province, he set about the execution of plans of political reorganization, at the same time fortifying various military positions, and getting together and drilling an army of 100,000 men. Very soon, however, he had to encounter the opposition of a strong party, headed by John of Giscala, and it was with difficulty that he averted an insurrection at Taricheæ, and afterward saved himself by flight from Tiberias. His enemies at one time succeeded in obtaining his recall; but the act was afterward canceled through the powerful influence he still possessed in Jerusalem. Meanwhile Vespasian had assembled a large force at Antioch, and in the spring of 67 threw a garrison into Sepphoris, whence (the troops of Josephus not waiting his attack) he made himself master of all Lower Galilee. Josephus, falling back on Tiberias, sent for large reënforcements from Jerusalem; these not being forthcoming, he in May shut himself up in Jotopata, the defense of which he maintained against all the efforts of the Romans for forty-seven days. At the end of that period the place was taken by storm, and such of the garrison as had not perished in the siege were put to death by the conquerors. The governor himself demanded to be led into the presence of the general, and, with great adroitness assuming the rôle of a prophet, told his captor that he was no chance prisoner, but had been commissioned by heaven to predict that he was shortly to become the sole head of the Roman empire. The plan was so far successful that the prisoner's life was spared; Vespasian, however, kept him in close confinement for two years, but on attaining the purple liberated him. Thenceforward Josephus assumed the family name of his patron (Flavius). After having accompanied Vespasian to Alexandria, he attended Titus to Palestine, and remained in his train until the close of the war. At the risk of his life he was more than once sent to urge his countrymen to yield, but without success. After the fall of the city he accompanied Titus to Rome, where Vespasian assigned him a residence in what had once been his own house, conferred on him the citizenship, and gave him a yearly pension, to which was afterward added an estate in Judæa. Under Titus and Domitian he was confirmed in all his privileges, devoting the peaceful remainder of his days to those literary labors with which his name is now so exclusively associated. The precise date of his death is unknown; he must have survived the first century, for his autobiography mentions the death of Agrippa II., which occurred in 100 A.D.

His extant works are the following:—(1) *History of the Jewish War*, in seven books. It was originally written in Aramaic for the benefit of the Jews dwelling beyond the Euphrates, but was afterward translated by its author into the Greek, which alone we now possess. Books i.–ii. 14 sketch the whole course of Jewish history from the period of the Maccabees to the beginning of the war. The remainder of the work gives a minute account of the entire struggle from 66 to its complete suppression in 73 A.D. On its completion the whole work was submitted to Vespasian, Titus, and Agrippa II., who, the author tells us, bore witness to its accuracy. Of its general trustworthiness there can be no reasonable doubt; Josephus had a considerable personal share in much of what he records; and on other points he seems to have had access to direct documentary evidence. (2) *Antiquities of the Jews*, in twenty books, a comprehensive Jewish history from the earliest times down to the outbreak of the war in 66. It was completed in the thirteenth year of Domitian (93–94 A.D.), long after the author's own interest in it had exhausted itself. For the first eleven books, covered by the Scripture narrative, his exclusive authority seems to have been the Bible itself, especially the LXX. translation. He frequently, however, omits or modifies points which seemed to him likely to give offense; sometimes he supplements with current traditions or uses the works of his predecessors in the same field, Demetrius and Artapanus; and occasionally he gives excerpts from profane writers. The remaining nine books are very unequal in merit. The period between Alexander the Great and the Maccabees is almost an entire blank. For the Maccabean wars (xii. 5–xiii. 7) he had 1 Macc. to draw upon; for the reigns of the later Hasmoneans (xiii. 8–xiv.) he is dependent upon the historians Strabo and Nicolaus of Damascus. The last-named writer is also his chief authority for the portion of his narrative which relates to the times of Herod (xiv.–xvii.), but he appears to have had access to some original memoirs. The last three books (xviii.–xx.), relating to the times immediately subsequent to the death of Herod, are more meager than might have been expected, and by the carelessness of their manner bear witness to the author's confessed fatigue. Book xviii. (chap. iii. sec. 3) contains a remarkable passage relating to Jesus Christ, which is twice cited by Eusebius as genuine (*H. E.*, i. 11; *Dem. Ev.*, iii. 3, 105–6), and which is met with in all the extant MSS. It is, however, unanimously believed to be, in its present form at least, spurious, and those who contend even for its partial genuineness are decidedly in the minority. (3) *Autobiography*, in seventy-six chapters, all of which, however, except the first six and the last two relate to the occurrences in Galilee in which he had so large a share during 66–67 A.D., written in defense of himself against the representations of a certain Justus of Tiberias. The *Vita*, which contains the allusion to the death of Agrippa II., must have been written at a date subsequent to 100 A.D. (4) *Against Apion*, in two books. This is the usual but somewhat misleading title of a general apology for Judaism in which the polemic against Apion occupies only a subordinate place.

JOSHUA, first the lieutenant and afterward the successor of Moses, was the son of Nun, of the tribe of Ephraim, and left Egypt, along with the rest of the children of Israel, at the time of the exodus. In the Pentateuch he is first mentioned as being the victorious commander of the Israelites in their battle against the Amalekites at Rephidim, and he is represented as having earned further distinction along with Caleb by his calm and courageous demeanor in the midst of the popular tumult caused by the report of the spies. On the death of Moses he assumed the leadership to which he had previously been designated by his chief, and the book known by his name is entirely occupied with details of the manner in which he carried out the task thus laid to his hand—that of taking possession of the land of Canaan. On the completion of the reconnaissance by the two spies, he left Shittim with his army, preceded by the priest-borne ark of the covenant. The Jordan having been miraculously crossed, his first encampment was at Gilgal. Jericho and Ai soon fell into his hands, and the people of Gibeon became vassals. In the neighborhood of Gibeon the five kings of the Amorites were crushed in a decisive battle in which the very elements conspired to favor the invader, and (to use the poetical language of the book of Jasher) "the sun stood still and the moon stayed until the people had avenged themselves upon their enemies." The victorious arms of Israel were now directed northward against a league of Canaanite potentates under the hegemony of Jabin, king of Hazor; anticipating the attack of the enemy, Joshua surprised and crushed them at the waters of Merom, Hazor itself being taken and burnt. Thus far the first twelve chapters of the book of Joshua; the remaining twelve describe the partition of the (conquered and unconquered) country among the twelve tribes, and conclude with a resumé of his parting exhortations. At the age of 110 he died and was buried in this inheritance in Timnath-serah, in the territory of Ephraim. For the book of Joshua, an integral part of that part of the Old Testament sometimes spoken of as Hexateuch, the reader is referred to the heading PENTATEUCH.

JOSIAH, the last but four of the kings of Judah, was the son of Amon, whom he succeeded when only eight years old, the people having declared in his favor against the conspirators who had murdered his unworthy father. The circumstances of the regency which must have existed during his minority are not recorded; it is not until his eighteenth year that he emerges into the light of history, when we find him interested in the repair of the temple at Jerusalem. The religious movement of which this was a symptom took more definite shape with the finding by Hilkiah the high priest of a copy of "the book of the law." The reasons for believing this to have been (substantially at least) the book of Deuteronomy cannot be detailed here. They were already appreciated by Jerome and Chrysostom, and no very careful examination is required to show that the effect of its perusal was to bring about a religious reformation, which in all its features was in accordance with the prescriptions and exhortations of that remarkable composition. On the secular aspects of the reign of Josiah Scripture is almost wholly silent. Thus nothing is related of the great Scythian invasion, which, as we know from Herodotus (i. 105), took place at this period, and must have approached Judah, being probably alluded to by Zephaniah and Jeremiah. The storm which shook the great world powers was favorable to the peace of Josiah's kingdom; the power of Assyria was practically broken, and that of the Chaldeans had not developed itself into the aggressive forms it afterward assumed. But in his thirty-first year Josiah for some unexplained reason was rash enough to place himself in the path of Pharaoh Necho in his military expedition against the king of Assyria; a disastrous encounter took place at Megiddo, in which he lost at once his crown and life.

JÓSIKA, MIKLÓS OR NICHOLAS, BARON (1794–1865), the greatest and, next to Jókai, most prolific Hungarian novelist, was born at Torda in Transylvania, of aristocratic and wealthy parents. So great was Jósika's literary activity that by the time of the revolution (1848) he had already produced about sixty volumes of romances and novels, besides numerous contributions to literary and political periodicals. Both as magnate of the upper house of the Hungarian diet and by his writings Jósika aided the revolutionary movement, with which he was soon personally identified, being chosen one of the members of the cómmittee of national defense. Consequently, after the capitulation at Világos (August 13, 1849), he found it necessary to flee the country, and settled first at Dresden and then, in 1850, at Brussels, where he resumed his literary pursuits anonymously. In 1864 he removed to Dresden, in which city he died.

JOSQUIN. See DEPRÉS, JOSQUIN, musical composer, ordinarily designated by the name Josquin.

JOST, ISAAK MARKUS (1793–1860), German historical writer, was born at Bernburg.

JOUFFROY, THEODORE-SIMON (1796–1842), a French philosopher, was born at Pontets, near Mouthe, department of Doubs.

JOURDAIN, ALFONSE, count of Toulouse, son of Count Raymond IV. by his third wife, Elvire de Castile, was born in 1103, in the castle of Mont-Pèlerin, Tripoli. His father died when he was two years old, and he remained under the guardianship of the count of Cerdagne until he was five. He was then taken to Europe, and his brother gave him Rouergue; in his tenth year he succeeded to the government of Narbonne, Toulouse, and Provence, but Toulouse was taken from him by the duke of Aquitaine while he was still in his minority. After the duke's death the inhabitants of Toulouse revolted and recalled Jourdain; he returned in triumph in 1123. He, however, drew upon himself a sentence of excommunication by his treatment of the religious community of St. Gilles, which had previously thrown in its influence on the side of the duke of Aquitaine. He had next to fight for the sovereignty of Provence against Raymond Beranger III., and not till September, 1125, did the war end in an amicable agreement. Under it Jourdain became absolute master of the regions lying between the Pyrenees and the Alps, Auvergne and the sea. His ascendancy was an unmixed good to the country, for during a period of fourteen years art and industry were successfully prosecuted. Louis VII., for some reason which has not appeared, besieged Toulouse in 1141, but without result. Next year Jourdain again incurred the displeasure of the church by siding with the rebels of Montpellier against their lord. A second time he was excommunicated. But his isolation from Rome did not suit his taste or policy; so in the autumn of 1144 he took the cross at the meeting of Vézelay called by Louis VII., and three years later he embarked for the East. He lingered on the way in Italy, and probably in Constantinople; but in 1148 he had arrived at Acre. Among his companions he had made enemies, and he was destined to take no share in the crusade he had joined. He was poisoned at Acre before hostilities commenced, either the wife of Louis or the mother of the king of Jerusalem suggesting the draught.

JOURNALISM. Journalism may be defined as the art of getting up a newspaper, and by the word newspaper, a daily, or, at the outside, a weekly publication of general circulation, is implied. Reviews and magazines, whether dealing with the abstruse problems of political economy and social regeneration, or furnishing an assortment of serial and short stories, poems, and sketches, for the passing of an idle hour, have nothing in common with journals proper. So also with the so-called trade papers and those devoted to scientific or other special subjects. They are not in this category any more than a grocer's price-current or a theater programme. A newspaper is and must be first of all a means of conveying news to the public, and journalism is the trade of the men who prepare this news.

From time to time we are favored with essays on "Schools of Journalism," generally the production of gentlemen whose ignorance of actual newspaper work is in direct proportion to their pronounced opinions regarding the necessity of a university for teaching the unteachable. For if it be true that the poet is born and not made, it is true also that the journalist must be born with an innate capacity for his work if ever he is to make any headway at it. His education can only be acquired in one school, and that the school of experience. Farming, driving a gig, and writing political editorials are accomplishments held to be within the powers of every adult male not an inmate of a lunatic asylum, but writing editorials is not all there is to journalism.

The preparation day by day of a great newspaper requires the services of hundreds of men in many and greatly varied capacities. Its mechanical make-up is a triumph of art, involving the use of intricate machinery and scientific processes; its business department must be as carefully guarded in every detail as the daily work of a bank or a merchant's office. The origin and development of the NEWSPAPER will be treated under that head, and for the mechanical processes involved the articles on PRINTING, TYPOGRAPHY, STEREOTYPING, etc., may be consulted.

Journalism is the intelligent application of trained labor to the gathering, selection, and presentation of actual news. The function of a newspaper is neither to amuse nor to instruct the public. It is perfectly true that the press of the day in this era of blanket-sheets publishes an immensity of what is properly magazine reading and an infinity of leaded-brevier advice on every conceivable subject. From the election of a president to that of a poundmaster, the reader is left in no doubt (until he takes up the opposition sheet) as to whom he should give his suffrage. Party politics sways the editorial page—supposed party necessity too often affects the news columns. The high protectionist organ devotes its editorial columns to advocating the blessings of a hundred per cent. ad valorem tax; the straight-out party publication inveighs against the demagogic doctrines of one political organization or the centralizing tendencies of another. This is not journalism any more than the attack of a Protestant church paper on the Pope, or the denunciation of the liquor trade by a prohibition publication, is journalism.

The business of a newspaper is to give the news, and the ideal newspaper would be the one which gave the best and freshest news in the most readable shape, and with due regard to the relative importance of the respective items. There is but one other desideratum of a perfect newspaper, and that is, that it should give all the news. To do this the news journal must also contain advertisements. These are news, the freshest, the most constantly varied, the most interesting news of all.

Without newspaper advertisements trade would be impossible, and newspapers would perish from the earth. By their means all can learn where best and cheapest to supply their wants, and by advertisements all can make their wants known. It is the task of the journalist to furnish his readers with a paper which shall combine the double functions of a narrator of the story of the world from day to day, and of an epitome of commercial information. To render his paper an acceptable medium to the public who want to sell or to buy, the journalist must offer the advantage of an extensive circulation. To obtain this circulation he must provide the news-seeking public with the best and fullest information gathered from every corner of the earth. The gathering and publishing of news is an expensive process, but for this the advertising columns furnish the sinews of war. The first-class newspaper attracts the first-class advertisements; the advertisements enable the publisher to create and maintain the first-class newspaper.

Journalism, in its highest development, requires for its successful exponent a business man with a knowledge and a proper appreciation of news. He should be well-read, but it is no more necessary that he should be able to write than it is that an art critic should be a professional painter in oils, or a rival of Phidias with the chisel. For forty years the London *Times* was edited by a man who, except in the rarest instances, never wrote a line. The editor of a great newspaper must know much of men if he knows little of books. His function is to plan and to direct, to scan the field of life as a general overlooks the field of battle, and to marshal his forces to the best advantage, leaving to others the execution of his plans. If he is given to fads and fancies and attempts to advocate them through his paper, by so much will he fail of making that paper perfect. System and detail are primal necessities of a newspaper. The managing editor is answerable for the establishment and maintenance of this system, and it is a task to tax the energies of a strong man.

In the preparation of a great metropolitan newspaper each department must work in harmony with all the others. The newspaper starts and finishes in the business office, and no amount of editorial talent will keep a paper long afloat if this department is mismanaged. The work of each day must be begun and completed in the twenty-four hours, and there is no leeway allowable. Assuming the mechanical department to be thoroughly organized and working as one machine, under the control of the business manager, the editor must take up his end of the chain. In the choice of his writers, to take the editorial or writing department first, he selects a staff of educated men, experienced in politics, in economics, and in general knowledge of men and history. Fine writing is in little demand on a daily newspaper. The work calls for men who can appreciate the significance of facts, who can extract the points of an article or a political movement, and who can state a conclusion tersely and in decent English. Specialists may be desirable for certain subjects, but to be successful from the standpoint of the newspaper they should never be enthusiasts. "Above all, no zeal," is the standing order.

News matter proper comes to a newspaper office in three forms: by the regular telegraph service, which is only indirectly controlled by the newspapers receiving it; by contributions (received nowadays almost entirely by telegraph), from special correspondents of the paper; and by means of the local reporters. The telegraph department requires the services of experts, and especially of men who know what to throw away. Every newspaper experiences every day the undesirable luxury of receiving far more news than it can find space for. Special correspondents, especially those permanently located in country towns and paid by space or per item, have a lamentable weakness for spinning out a few threads of fact into a long yarn. These are the men who preface every record of a suicide with the statement that "the sad affair has cast a pall of gloom over the community." From them come the weird stories about the wrecking of the circus and the mammoth aggregation, and the escape of the deadly tiger to the woods. Aside from this, the telegraph editor lives in an atmosphere of absolute uncertainty as to the moment at which news of some destructive catastrophe or important happening may come in. During the day, the managing editor has received communications from scores of points, and has ordered a greater or less amount of telegrams about various occurrences. A paragraph in an afternoon paper, a rumor at a railroad station or in a hotel lobby, may give him the necessary pointer about a disastrous accident at some lonely spot, miles from a news center. This he may cover by telegraphing to correspondents who may be able to reach the scene, or at least to pick up some details from trainmen. Or if the affair is not beyond reach a special man, often taken at a moment's notice from the local staff, starts out. He does not need any instructions; all he has to do is to get there, find out the facts, and then get them in in time. If he succeeds, especially if by good luck he succeeds while a competitor fails, he has the consciousness of having performed his duty—if he fails his explanations are not usually well received.

The special telegrams from Washington, from the seat of the State government while the legislature is in session, and from important cities where regular correspondents are maintained, give less trouble to the telegraph editor than the sporadic contributions of the local correspondent. Anything of importance is usually reported as coming and arrangements made for space. But Congress keeps late hours and takes important votes regardless of telegraph editors, while the flood or the cyclone which may call for a half-page account may not be heard of until midnight and may necessitate the overhauling of a page of matter already in type. An entire remodeling of headlines necessarily accompanies this change, and a second or even third edition may have to be issued for late foreign news. Laws stricter than those of the Medes and Persians govern the hour of going to press and regulate every detail of the mechanical work.

Next in importance to the telegraphic news, and on special occasions far transcending it, is the local budget. The local department is in the hands of the city editor and his assistants. On important papers there is a day city editor and a night one. There are office men to read copy, prepare headings, and keep a schedule. The actual news gathering is done by the ubiquitous reporter. Contrary to the general opinion, this greatly misunderstood individual does not walk about the city at his own sweet will and pick up items by chance. He has a faculty of getting there when anything happens, it is true, but he has no understanding with the powers of evil to enable him to be always on the spot when a fire occurs in the outskirts of the city or a man is murdered at midnight four miles from a newspaper office. Reportorial work is divided up, according to the amount of news going. The city editor enters on his assignment-book, days and weeks in advance, all regular meetings of civic bodies, clubs, and organizations of which he can obtain knowledge, and deputes reporters to attend them. The court reporters spend the day at the courts, prepare the records, and report all cases importance. Men are detailed specially for trials, the city council, the county board, and other munic centers. One man attends to all routine railroad matters, another to the lake or river marine.

The proceedings of the board of trade, the fluctuations of prices, and the thousands of happenings in commercial and financial life, occupy the attention of a commercial editor, a financial editor, and their assistants. One man at least on each paper makes the round of the hotels and with a perseverance worthy of a better cause, interviews the latest arrival from Puget Sound or New South Wales, the traveling politician, or the visiting statesman. Every large paper has three or four reporters who may be said to have a roving commission in one sense, although actually their work requires the closest attention. Their business is to visit the police stations, making their headquarters at the city hall or central police station and to note all arrests, fires, and other happenings occurring between their hour of beginning work (on a morning paper say 6 P.M.) and the time their paper goes to press. This is the real school of the reporter. A bright, smart young fellow with a decent high-school education and not afraid of work, beginning as a police reporter on a metropolitan newspaper obtains an experience not to be had anywhere else. The life is a rough one, but it has its charms, and the work is of such a character as to call out all the best qualities of a newspaper man. At midnight a report comes by telephone from an outside station that a stabbing affray has occurred in a saloon and that one or more persons have been arrested. Intimate knowledge of the city and familiarity with the transportation system enables the reporter to decide on the moment how to best reach the spot. If a cab is necessary on account of time, he takes one, and if help is needed, as in case of a large fire, he telephones his office for assistance. Meantime he makes for the scene as quickly as possible and the men sent will find him, take instructions from him and work with him for the best interest of their paper. The glory of the night man is the "scoop." If by his superior acquaintance with the police, or by luck or sagacity he can get some news item—an arrest, for instance, where the criminal is locked up at an outside station—and can get the facts to the exclusion of his competitors, he rejoices beyond measure. The night man gravitates naturally to the chair of the city editor, for he learns what news is, how to get it, and how to handle it.

Of other departments of a newspaper the more important not yet mentioned are those of the exchange and news editors. The exchange editor is generally a man of considerable experience, and his work is to select from the stacks of "exchanges" all kinds of matter for use by the various departments. He clips horse and base-ball notes for the sporting editor; notices of changes of pastorates for the religious column; musical and dramatic gossip, short stories, matters relating to local celebrities, important news items of which only brief mention has been made in the telegraph columns. Everything is game for his scissors. The news editor takes care of news items and in many cases has control of the outside correspondence. Most newspapers make a specialty, weekly at least, of sporting in its various forms, the drama, household recipes, insurance and banking, trade and financial reviews and real estate. These are handled by one or other of the editors or often by reporters, each taking a department. There is a musical and a dramatic critic on all papers and on some a religious editor is maintained, while the doings of secret societies and benevolent organizations form a department of some newspapers, and others make a specialty of reporting labor movements.

Although the American newspapers have not yet adopted the French system of the feuilleton, a good many publish once a week a continued story, and all devote a large portion of their Sunday issue to stories, sketches, and occasionally verses. Several papers have attained notoriety in the past by the performances of a "funny man," who, by the means of dialect, archaic spelling, or the revamping of ancient Joe Millerisms, filled a column. The better class of newspapers have, however, abandoned this adventitious aid and relegated the Jack Puddings of journalism to the professedly funny weeklies. The sketches in the Sunday editions, when bearing on local subjects, are contributed by men who work "on space," that is, are paid by the column. These articles are ordered by the editor, and the subjects, if well selected, cover matters of local interest, but not strictly possessing value as news. The short stories as a rule are flotsam and jetsam hauled in by the exchange editor and found in magazines. A good many of these also are furnished by syndicates; that is, are supplied to a number of papers at one time and at very low rates. Of late years a mania for illustrations has overcome American newspapers and many of these articles are illustrated. The process of newspaper printing and the quality of paper used do not lend themselves to the making of first-class pictures, and some of the illustrations, notably the alleged portraits, resemble nothing in earth or heaven and would justify a suit for libel.

It will be seen by the foregoing necessarily brief sketch of an American newspaper and its method of construction that to be a thorough journalist a man must have an all-around knowledge, a versatile talent, good descriptive powers, ability to judge of men and to weigh the importance of events, a clear head in emergencies, quickness of decision and an absolute imperturbability which nothing can shake. If in addition to all these he possesses the desire to make his paper a living force and to furnish his readers with the best news, the latest news and nothing but the news, condensed into readable English, he has in him the elements of a true journalist and is the master of a profession which knows nothing of schools, and which in many respects is one of the most interesting and unique products of modern civilization.

JOUVENET, JEAN, born at Rouen in 1647, came of a family of painters, one of whom had had the honor of teaching Poussin. He early showed remarkable aptitude for his profession, and, on arriving in Paris, attracted the attention of Le Brun, by whom he was employed at Versailles, and under whose auspices, in 1675, he became a member of the Royal Academy, of which he was elected professor in 1681, and one of the four perpetual rectors in 1707. The great mass of works that he executed, chiefly in Paris, many of which, including his celebrated *Miraculous Draught of Fishes*, are now in the Louvre, show his fertility in invention and execution, and also that he possessed in a high degree that general dignity of arrangement and style which distinguished the school of Le Brun. Jouvenet died on April 5, 1717, having been forced by paralysis during the last four years of his life to work with his left hand.

JOVELLANOS, or JOVE LLANOS, GASPAR MELCHOR DE (1744-1811), statesman and author, was born at Gijon in Asturias, Spain.

JOVIANUS, FLAVIUS CLAUDIUS, Roman emperor from June 27, 363, to February 17, 364, was the son of the brave general Varronianus, and was born at Singidunum in Mœsia about 332. As captain of the guard (*primus ordinis domesticorum*) he accompanied Julian in his Persian expedition; and on the day after that emperor's death, when the aged Sallust declined the purple, the voices of the army beyond the Tigris were united in Jovian's favor. The new emperor's first care was to continue the retreat begun by Julian; and he had with difficulty reached the rapid and well-nigh impassable Tigris, when overtures of peace were made by the Persian king Sapor II., who had not ceased to harass the Roman march. Jovianus was not in a position to command easy terms; the famished and exhausted state of his army compelled his assent to a humiliating treaty, which gave up to the Persians the provinces of Arzanene, Corduene, Mexoene, Rehimene, and Zabdicene, which had been conquered by Galerius in 297, and Nisibis and other cities. From this time the Greek and Christian influence dates its decline in the trans-Euphrates regions. On February 17, 364, Jovianus was found dead in his bed at Dadastana, a small town of Galatia. The suspicion of foul play is unsupported by evidence. He was succeeded by Valentinian and Valens, after an interregnum of ten days.

JOVINIANUS, or Jovianus, a Roman monk and reputed heretic who flourished during the latter half of the fourth century.

JOVIUS, Paulus, or Paolo Giovio (1483–1552), an Italian historian and biographer, was born of an ancient and noble family at Como.

JUANES, or Joanes, Vicente (1523–1579), head of the Valencian school of painters, and often called "the Spanish Raphael," was born at Fuente de la Higuera in the province of Valencia. Of his biography practically no authentic facts have been preserved.

JUAN FERNANDEZ, a small island in the South Pacific, 400 miles west of Valparaiso. The Spaniards also designate it *Mas-a-Tierra*, "more to land," to distinguish it from a smaller island, *Mas-a-Fuera*, "more to sea," nine miles farther west. The aspect of Juan Fernandez is beautiful and striking; only thirteen miles in length by four in width, it consists of a series of precipitous rocks rudely piled into irregular blocks and pinnacles.

Juan Fernandez was discovered by a Spanish pilot of that name (who was also the discoverer of the island of Mas-a-Fuera) in 1563.

In February, 1700, Dampier called at Juan Fernandez, and while there Captain Straddling of the *Cinque Porte* galley quarreled with his men, forty-two of whom deserted but were afterward taken on board by Dampier; five seamen, however, remained on shore. In October, 1704, the *Cinque Porte* returned and found two of these men, the others having been apparently captured by the French. On this occasion Captain Straddling had a disagreement with his master, Alexander Selkirk, who insisted upon being put on shore rather than serve longer with Straddling. Selkirk's desire was complied with, and he was sent on shore with a few ordinary necessaries. Before the ship left he begged to be readmitted; but this was refused, with the curious result that, with little merit of his own, Selkirk has become a hero for all time, and "Robinson Crusoe's Island" the cynosure of all boys' eyes. Alexander Selkirk was relieved from what appears to have been a by no means unbearable exile in 1709 by the ship *Duke*, Capt. Wood Rodgers.

JUAREZ, Benito Pablo, president of Mexico, was born near Ixtlan, in the state of Oajaca, Mexico, March 21, 1806, of full Indian blood. Early left in poverty by the death of his father, he received from a charitable friar a good general education, and afterward the means of studying law. Beginning to practice in 1834, Juarez speedily rose to professional distinction, and in the stormy political life of his time and country took a prominent part as an exponent of liberal views. In 1832 he sat in the state legislature; in 1846 he was one of a legislative triumvirate for his native state and a deputy to the republican congress, and from 1847 to 1852 he was governor of Oajaca. Banished in 1853 by Santa Anna, he returned to Mexico in 1855, and joined Alvarez, who, after Santa Anna's defeat, made him minister of justice. Under Comonfort, who succeeded Alvarez in December, 1855, Juarez was made president of the supreme court of justice and minister of the interior; and, when Comonfort was unconstitutionally replaced by Zuloaga in 1858, the chief-justice, in virtue of his office, claimed to be legal president of the republic. It was not, however, till the beginning of 1861 that he succeeded in finally defeating the unconstitutional party and in being duly elected president by congress. His decree of July, 1861, suspending for two years all payments on public debts of every kind, led to the landing in Mexico of English, Spanish and French troops. The first two powers were soon induced to withdraw their forces; but the French remained, declared war in 1862, placed Maximilian upon the throne as emperor, and drove Juarez and his adherents to the northern limits of the republic. Juarez maintained an obstinate resistance, which resulted in final success. In 1867 Maximilian was taken at Queretaro, and shot; and in August Juarez was once more elected president. His term of office was far from tranquil; discontented generals stirred up ceaseless revolts and insurrections; and, though he was reëlected in 1871, his popularity seemed to be on the wane. He died of apoplexy in the city of Mexico, July 18, 1872.

JUBA I., successor to his father Hiempsal on the throne of Numidia, owes his importance much more to the distracted state of the Roman world during the struggle between Cæsar and Pompey than to his intrinsic merit. He embraced Pompey's cause, moved by ancient hereditary friendship to that general, as well as by personal enmity to Cæsar, who had insulted him at Rome a few years before, and to Curio, Cæsar's general in Africa, who had openly proposed when tribune of the plebs in 50 B.C. that Numidia should be sold to colonists, and the king reduced to a private station. In 49 B.C. Juba marched against Curio, who was threatening Utica, and by a stratagem inflicted on the Cæsarean army a crushing defeat, in which Curio was slain. Juba's attention was momentarily distracted by a counter invasion of his territories by Bocchus and Sittius; but, finding that his lieutenant Saburra was able to defend his interests, he rejoined Scipio with a large body of troops. With Scipio he shared the defeat at Thapsus. Fleeing from the field with the Roman general Petreius, the king wandered about for some time as a fugitive, spurned even from the gates of his own city Zama, where he had prepared for a desperate siege. The fugitives at length resolved to die by mutual slaughter. Juba killed Petreius, and sought the aid of a slave in dispatching himself, (46 B.C.)

JUBA II., king of Mauretania, was on the death of his father Juba I. in 46 B.C. carried to Rome, a mere infant, to grace Cæsar's triumph. He seems to have received a good education under the care of Octavianus (afterward Augustus), whom he accompanied later in his campaign against Antony. In 20 B.C., after Antony's death, Octavianus gave the young African the hand of Cleopatra Selene, daughter of Antony and Cleopatra, and placed him on his paternal throne. In 25 B.C., however, he transferred him from Numidia to the kingdoms formerly held by Bocchus and Boguas. Juba fixed his royal residence at Jol, whose name he changed to Cæsarea, and which is now identified with the modern Cherchel, about seventy-two miles west of Algiers. He seems to have reigned in considerable prosperity, though in 6 A.D. the Gætulians rose in a revolt of sufficient importance to afford the surname Gætulicus to Cornelius Cossus, the Roman general whose aid the king called in to suppress it. According to Josephus, Juba married in second nuptials Glaphyra, daughter of Archelaus of Cappadocia, and widow of Alexander, son of Herod the Great, afterward wife of Alexander's brother, the Archelaus of the New Testament. The date of Juba's death is by no means certain; from the evidence of coins and certain allusions in Strabo, scholars have been led to place it in 19 or 20 A.D.

JUBBULPORE. See JABALPUR.

JUBILEE, or JUBILE, THE YEAR OF. In Ezek. xlvi. 16, 17, there is indication of a law according to which "the prince" is at liberty to alienate in perpetuity any portion of his inheritance to his sons; but if he give a gift of his inheritance to any other of his subjects, then the change of ownership holds good only till "the year of liberty," after which the alienated property returns to its original possessor, the prince. This restriction upon the transfer of real property is applied to a greatly enlarged class of persons and cases in Lev. xxv. 8–55, which is by far the most important passage relating to this subject. It is again referred to in Lev. xxvii. 17–25, and the only other allusion to it in the Pentateuch occurs in Numb. xxxvi. 4. According to Lev. xxv. 8–12, at the completion of seven sabbaths of years, the trumpet of the jubilee is to be sounded "throughout the land," on the tenth day of the seventh month, *i.e.*, on the great day of atonement. The fiftieth year thus announced is to be "hallowed," *i.e.*, liberty is to be proclaimed everywhere to everyone, and the people are to return "every man unto his possession and unto his family." The year in other respects is to resemble the sabbatical year; there is to be no sowing, nor reaping that which grows of itself, nor gathering of grapes. Coming to fuller detail—as regards real property, the law is that if any Hebrew under pressure of necessity shall alienate his property he is to get for it a sum of money reckoned according to the number of harvests to be reaped between the date of alienation and the first jubilee year. Should he or any relation desire to redeem the property before the jubilee, this can always be done by repaying the value of the harvests between the redemption and the jubilee. The same rule applies to dwelling-houses of unwalled villages; the case is different, however, as regards dwelling-houses in walled cities. These may be redeemed within a year after transfer, but if not redeemed within that period they continue permanently in possession of the purchaser. An exception to this last rule is made for the houses of the Levites in the Levitical cities. As regards property in slaves, the Hebrew whom necessity has compelled to sell himself into the service of his brother Hebrew is to be treated as a hired servant and a sojourner, and to be released absolutely at the jubilee; non-Hebrew bondmen on the other hand are to be bondmen forever. But the Hebrew who has sold himself to a stranger or sojourner is entitled to freedom at the year of jubilee, and further is at any time redeemable by any of his kindred—the redemption price being regulated by the number of years to run between the redemption and the jubilee, according to the ordinary wage of hired servants. So much for the Levitical law; as regards its observance, the evidence of history is not voluminous, but Jer. xxxiv. 14 seems to show conclusively that in his time at least the law acknowledged by the prophets was that described in Deut. xv., according to which the rights of Hebrew slaveholders over their compatriots were invariably to cease seven years after they had been acquired. After the exile the law of Lev. xxv. was also certainly disregarded; the Talmudists and Rabbins are unanimous that although the jubilee years were "reckoned" they were not observed.

JUBILEE YEAR, in the Roman Catholic Church, is observed every twenty-fifth year, from Christmas to Christmas. During its continuance plenary indulgence is obtainable by all Catholics, on condition of their penitently confessing their sins and visiting certain churches a stated number of times, or doing an equivalent amount of meritorious work. The institution does not go farther back than to the time of Boniface VIII., whose bull is dated April 22, 1300.

JUBILEES, BOOK OF THE. See APOCALYPTIC LITERATURE.

JUDÆA. See PALESTINE.

JUDAH (Yehûda, *i.e.*, according to the etymology given in Gen. xxix. 35, "praised"), the name of one of the twelve tribes and of their eponymus the fourth son of Jacob by Leah. Except in the history of Joseph, the Biblical interest attaching to Judah belongs not to the individual but to the tribe. According to the usual form of such statements in the Old Testament, Judah's marriage with the daughter of the Canaanite Shuah is to be referred to a union of the tribe with Canaanite elements. Judah and Simeon seem to have broken off from Israel at Gilgal, and taken a separate course. In the song of Deborah the tribe is not named among the rest, and even in the time of David, Judah and Israel are still more conscious of their separation than of their original unity. Indeed the two soon fell apart again at the division of the kingdom, but after the time of David the idea of unity was never lost; and, while the prophets look for a restoration of the realm of the house of Jesse, Deut. xxxiii. 7 (the work of a poet of Ephraim) prays for victory for Judah against his enemies and his ultimate restoration to his people, the greater Israel of the north. The blessing of Jacob, on the other hand, views Judah in the light of the Davidic sovereignty as holding the hegemony over his brethren until the coming of the Messiah.

JUDAS ISCARIOT, the son of Simon Iscariot, and one of the twelve apostles; he was always enumerated last, with special mention of the fact that he was the betrayer of Jesus.

JUDAS MACCABÆUS. See ISRAEL and MACCABEES.

JUDAS TREE, the *Cercis Siliquastrum* of botanists, belongs to the section *Cæsalpineæ* of the natural family *Leguminosæ*. It is a native of the south of France, Spain, Portugal, Italy, Greece, and Asia Minor, and forms a handsome low tree with a flat spreading head. In spring it is covered with a profusion of purplish pink flowers, which appear before the leaves. The flowers have an agreeable acid taste, and are eaten mixed with salad or made into fritters. The tree was one frequently pictured by the older herbalists.

JUDE. The writer of the epistle of St. Jude calls himself (ver. 1) "the brother of James." In primitive Christian times, among the Judæo-Christians to whom this epistle, from the nature of its contents, must have been addressed, there was but one James who could be thus spoken of without any further description, viz., James "the Lord's brother" (see JAMES). The writer of this epistle, then, claims to be the Judas named among the brethren of the Lord in Matt. xiii. 55, Mark vi. 3. He seems himself to declare by implication that he was not an apostle (ver. 17), and with this agrees the statement that at a time not long before the crucifixion the brethren of Jesus did not believe on Him. And it is some confirmation of this position that the writer of the epistle of St. James in like manner does not claim to be an apostle. The brethren of the Lord are spoken of in Acts i. 14 as distinct from the apostolic body, and are placed last in the enumeration, as though latest included among the believers; and that their feeling toward Jesus should have been changed since His death and resurrection has been thought to be sufficiently explained by the assertion of St. Paul that the Lord had been "seen of James" on one special occasion after he had risen from the dead. We conclude, therefore, that the writer of the epistle was a different person from Jude the apostle, who appears also to have had the names Lebbæus and Thaddæus.

JUDGE, an officer appointed in a state to administer the law. The duties of the judicial office, whether in a civil or a criminal matter, are to hear the statements on both sides in open court, to arrive at a conclusion as to the truth of the facts submitted to him, or when a jury is engaged to direct the jury to find such a conclusion, to apply to the facts so found the appropriate rules of law, and to certify by his judgment the relief to which the parties are entitled or the obligations or penalties which they have incurred. With the judgment the office of the judge is at an end, but the judgment sets in motion the executive forces of the state, whose duty it is to carry it into execution.

In the United States, judges of the supreme courts, as well as ambassadors and other public functionaries, are nominated and appointed by the president with the consent of the Senate, and hold their offices during good behavior. In the various States the practice varies, but the tendency is in favor of electing the judges and limiting their tenure of office.

JUDGES, THE BOOK OF, as we now read it, constitutes a sequel to the book of Joshua, covering the period of history between the death of the son of Nun and the birth of Samuel. But it is well known the present adjustment of the older historical books of the Old Testament to form a continuous record of events from the creation to the Babylonian exile is due to an editor, or rather to successive redactors, who pieced together and reduced to a certain unity older memoirs of very different dates; and closer examination shows that the continuity of many parts of the narrative is more apparent than real. This is very clearly the case in the book of Judges.

JUDGMENT is the last stage in an action, being the definitive order or sentence of the court or judge, enforceable by the appropriate mode of "execution" appointed by law.

JUDICATURE, JUDICATURE ACTS. The Judicature Acts are an important series of English statutes having for their object to simplify the system of judicature in its highest branches.

JUDITH, a Jewish heroine, who saved her native town, Bethulia, by a deed of unexampled daring and devotion. She made her way into the hostile camp, and into the very tent of Holofernes, general of Nebuchadnezzar. The general was bewildered by her beauty, and she plied him with wine till he sank overpowered upon his couch. Then she cut off his head, and found her way out carrying it with her. Her townsmen were inspired with a sudden enthusiasm, rushed out upon the enemy, and completely defeated them. The tale is not mentioned by Josephus, and has from an early period been held to be an allegory. It forms the subject of the apocryphal book of *Judith*, the composition of which is put variously between the time of the Maccabees and the time of the second Jewish war under Hadrian. The exploit of Judith has given a frequent subject to art: here we may merely mention the bronze group of Donatello at Forence; the paintings by Botticelli, Cranach, Horace Vernet, and Etty; the poetic elaborations of the theme by Hans Sachs, Opitz, and Hebbel.

JUDITH, THE BOOK OF, one of the books of the Old Testament APOCRYPHA (*q.v.*), takes its name from the heroine Judith, to whom the last nine of its sixteen chapters relate. In the Septuagint and Vulgate it immediately precedes Esther, and along with Tobit comes after Nehemiah; in the English Apocrypha it is placed between Tobit and the apocryphal additions to Esther.

JUDSON, ADONIRAM, was born at Malden, Mass., August 9, 1788. In 1812 he was ordained a missionary to Burmah under the auspices of the Congregational Board of Foreign Missions. Having after his arrival in India adopted Baptist views, he was appointed to labor in Burmah by the American Baptist Missionary Union in 1814. His translations of the Bible into Burmese appeared in 1835, and his *Burmese and English Dictionary* in 1852. He died April 12, 1850. Both in his literary and his missionary labors he was greatly assisted by the three ladies whom he successively married, of whom, as well as of Judson, biographies have been published.

JUGGERNAUT, or PURI, is the name of a town on the coast of Orissa, at the southern end of the delta of the Mahanadi, celebrated as one of the chief holy places in India. With a resident population of 22,000, and some 6,000 lodging-houses for pilgrims, it owes its reputation to a temple erected there in honor of Vishnu, and containing an idol of this Hindu god, called *Jagannáth* or *Juggernaut*, a corruption of the Sanskrit word *Jagannátha*—i. e., Lord of the World. It was long a sacred city of the Buddhists, the abode of the Golden Tooth of Buddha. The first historical mention of Jagannáth is in 318 A. D. He represents Vishnu in all his manifestations, and is in a special sense the god of the people. The great festivals sometimes bring 100,000 pilgrims; and the annual offerings may amount to as much as $185,000, besides Jagannáth's revenue of $155,000 from lands and various religious houses. The temple inclosure comprises 120 temples, the chief pagoda being that of Jagannáth, with a tower 192 feet high. There are twenty-four annual festivals in his honor, the chief being the car festival, when Jagannáth (who is armless) is dragged on his car (45 feet high, 35 feet square, with sixteen wheels, each 7 feet in diameter) to his country-house. This is less than a mile distant from the temple, but the heavy sand extends the short journey to several days, until the exhausted devotees resign the task to professional car-pullers, who have also to assist the idol home again. The car festival has been currently believed to be the occasion of numerous cases of self-immolation, the frantic devotees committing suicide by throwing themselves before the wheels of the heavy car. This is, it would appear, a calumny of English writers. See Sir W. W. Hunter's work on Orissa (1872), in which he "carefully examined the whole evidence on the subject, from 1580, when Abul Fazl wrote, through a long series of travelers, down to the police reports of 1870," and came to "the conclusion, which H. H. Wilson had arrived at from quite different sources, that self-immolation was entirely opposed to the worship of Jagannáth, and that the rare deaths at the car festival were almost always accidental."

JUGURTHA. After the final conquest of Carthage by the Romans in 146 B.C., the larger part of the north of Africa was practically under Roman control. The so-called province, indeed, of Africa, as then constituted, was but a small strip of territory, comprising the possessions retained by Carthage during the few years previous to her downfall. It coincided with the northeastern portion of Tunis. Over this extensive territory, parts of which are rich and populous, Masinissa had ruled for many years, and had rendered Rome substantial aid in her war with Carthage. On his death in 149 B.C., his sovereign power was divided under the direction of Scipio Africanus the younger, the conqueror of Carthage, between his three sons Micipsa, Gulussa, and

Mastanabal. The actual government, however, was chiefly in the hands of an illegitimate son of Mastanabal, Jugurtha.

In 118 B.C. Micipsa died. He had thought it politic to adopt Jugurtha, and to provide by his will that he should be associated with his own two sons, Adherbal and Hiempsal, in the government of Numidia. Scipio had written to Micipsa a strong letter of recommendation in favor of Jugurtha; and to Scipio, accordingly, Micipsa intrusted the execution of his will. His testamentary arrangements thus had the Roman guarantee, but they utterly failed. The princes soon quarreled; and Jugurtha, who was thoroughly unscrupulous, claimed the entire kingdom. His cousin Hiempsal he contrived to have assassinated; and Adherbal he quickly drove out of Numidia by force of arms, compelling him to take refuge in the Roman province of Africa. Adherbal sought safety in Certa (Constantina), the chief town of Numidia, and a strong fortress. Here he was besieged by Jugurtha, and ultimately captured and killed.

The war dragged on till in 106 B.C., Marius was called on by the vote of the Roman people to supersede Metellus. The Numidian fell into an ambush through his father-in-law's treachery, and was conveyed a prisoner to Rome. Two years afterward, in 104 B.C., he figured with his two sons in Marius' triumph, and in the subterranean prison beneath the Capitol, "the bath of ice," as he called it, he was either strangled or starved to death.

JUJUBE. Under this name the fruits of at least two species of *Zizyphus* are usually described, namely, *Z. vulgaris* of Lamark and *Z. Jujuba* of the same author. The species of *Zizyphus* are for the most part small trees or shrubs, armed with sharp, straight, or hooked spines, having alternate leaves and fruits, which are in most of the species edible, and have an agreeable acid taste; this is especially the case with those of the two species mentioned above.

JUKES, JOSEPH BEETE, geologist, was born near Birmingham, England, in 1811, and died in 1869.

JULIAN, commonly called Julian the Apostate, was Roman emperor for about a year and eight months (361–363). His full name was Flavius Claudius Julianus. He was born at Constantinople in 331, being the son of Julius Constantius and his wife Basilina, and nephew of Constantine the Great. He was thus a member of the dynasty under whose auspices Christianity became the established religion of Rome.

Julian lost his mother not many months after he was born. He was only six when his imperial uncle Constantine died; and one of his earliest memories must have been the fearful massacre of his father and kinsfolk, in the interest and more or less at the instigation of the sons of Constantine. From this period till his twenty-fifth year Julian passed his life in the closest retirement, jealously watched by the reigning emperor, often under immediate fear of death. He was trained to the profession of the Christian religion; but he became early attracted to the old faith, or rather to the idealized amalgam of paganism and philosophy which was current among his teachers, the rhetoricians.

But a member of the Roman imperial house could not thus be allowed to escape the public responsibilities connected with his birth. The emperor Constantius and he were now the sole surviving male members of the family of Constantine; and, as the emperor again felt himself oppressed by the cares of government, there was no alternative but to call Julian to his assistance. At the instance of the empress he was summoned to Milan; and there from Constantius, who had been chiefly concerned in the murder of his family, he received the hand of Helena, sister of the emperor, as also the title of Cæsar and the government of Gaul. It was with extreme reluctance that Julian entered on his new dignities.

A task of extreme difficulty also awaited him beyond the Alps. During recent troubles the Alemanni and other German tribes had crossed the Rhine; they had burned Cologne, Treves, Strasburg, and many other flourishing cities, and extended their ravages far into the interior of Gaul. The internal government of the province had also fallen into great confusion. In spite of his inexperience, and by virtue of his native energy and ability, Julian quickly brought affairs into order. He completely overthrew the Alemanni in the great battle of Strasburg (357). The Frankish tribes which had settled on the western bank of the lower Rhine were reduced to submission. Five times in all he crossed the river to overawe the restless tribes beyond. In Gaul he rebuilt the cities which had been laid waste, reëstablished the administration on a just and secure footing, and as far as possible lightened the taxes, which weighed so heavily on the poor provincials. Paris was the usual residence of Julian during his government of Gaul, and his name has become inseparably associated with the early history of the city.

The position and reputation of Julian were now established. He was general of a victorious army enthusiastically attached to him, and governor of a province which he had saved from ruin; but he had also become an object of fear and jealousy at the imperial court. It was accordingly resolved to weaken his power. A threatened invasion of the Persians was made an excuse for withdrawing some of the best legions from the Gallic army. Julian recognized the covert purpose of this, yet proceeded to fulfill the commands of the emperor. A sudden movement of the legions themselves decided otherwise. At Paris, on the night of the parting banquet, they forced their way into Julian's tent, and, proclaiming him emperor, offered him the alternative either of accepting the lofty title or of instant death. Julian accepted the empire, and sent an embassy with a deferential message to Constantius. The message being contemptuously disregarded, both sides prepared for a decisive struggle. After a march of unexampled rapidity through the Black Forest and down the Danube, Julian reached Sirmium, and was on the way to Constantinople, when he received news of the death of Constantius at Mompsocrene in Cilicia (361). Without further trouble Julian found himself everywhere acknowledged the sole ruler of the Roman empire.

Julian had already made a public avowal of paganism, of which he had been a secret adherent from the age of twenty. It was no ordinary profession, but the expression of a strong and even enthusiastic conviction; the restoration of the pagan worship was to be the great aim and controlling principle of his government. His reign was too short to show what precise form the pagan revival might ultimately have taken, how far his feelings might have become embittered by his conflict with the Christian faith, whether persecution, violence and civil war might not have taken the place of the moral suasion which was the method he originally affected. He issued an edict of universal toleration.

Having spent the winter of 361–62 at Constantinople, Julian proceeded to Antioch to prepare for his great expedition against Persia. His stay there was a curious episode in his life. Strange to say, it is doubtful whether his pagan convictions or his ascetic life, after the fashion of an antique philosopher, gave most offense to the so-called Christians of the dissolute city. They soon grew heartily tired of each other, and Julian took up his winter quarters at Tarsus, from which in early spring he marched against Persia. At the head of a powerful and well-appointed army he advanced through Mesopotamia and Assyria as far as Ctesiphon, near which he crossed the Tigris, in face of a Persian army which he defeated. Misled by the treacherous advice of a Persian nobleman, he desisted from the siege of that great city, and set out to seek the main army of the enemy under King Sapor. After a long and useless march into the interior he was forced to retreat, when he found himself enveloped and harassed by the whole Persian army, in a waterless and desolate country, and at the hottest season of the year. The Romans repulsed the enemy in many an obstinate battle. In one of these, however, on June 26, 363, Julian, who was ever in the front, was mortally wounded. The same night he died in his tent.

JÜLICH (Fr., *Juliers*), the chief town of a circle in the government district of Aachen, Prussia, and capital of the former duchy of Jülich, situated on the right bank of the Roer, about sixteen miles northeast of Aachen (Aix-la-Chapelle). Population, 5,111.

JULIEN, NOEL, afterward called STANISLAS-AIGNAN JULIEN, was born at Orleans, April 13, 1797. His father, who was a mechanic, being desirous of improving the position of his son, destined the young Stanislas-Aignan for the priesthood, and in preparation for that calling sent him to the seminary in his native town. Here his extraordinary talent for the acquisition of languages first displayed itself, and with his knowledge increased his repugnance to the profession marked out for him. His favorite study at this time was Greek literature, and so recognized did his scholarship become that, when he went to Paris in 1821, he received the appointment of assistant professor of Greek at the Collége de France. At this period his attention was drawn to the lectures being delivered by Abel Rémusat on the Chinese language, and being attracted to the study he placed himself under the tuition of that professor. In this new pursuit his progress was as marked and as rapid as formerly in Greek. In 1823 he published a translation in Latin of a part of the works of Mencius, one of the nine classical books of the Chinese, and, though this volume appeared within two years of his having taken up the study of the language, it justified its publication by its success. A year later he produced a translation of the modern Greek odes of Kalvos under the title of *La Lyre patriotique de la Grèce*. In 1831 he was elected a member of L'Académie des Inscriptions et Belles-Lettres de l'Institut de France in the place of Saint-Martin, and in the following year he succeeded Rémusat as professor of Chinese at the Collége de France. For some years his studies had been directed toward the dramatic and lighter literature of the Chinese, and in rapid succession he now brought out translations of different Chinese works. He died in 1873.

JÜLIERS. See JÜLICH.

JULIUS I., pope from 337 to 352, was a native of Rome, and was chosen as successor of Marcus after the Roman see had been vacant four months. He is chiefly known by the part which he took in the Arian controversy. Julius was succeeded by Tiberius.

JULIUS II., pope from 1503 to 1513, was born at Savona in 1443. He was the son of a brother of Sixtus IV., his original name being Giuliano della Rovere. He does not appear to have joined the order of St. Francis, but to have remained one of the secular clergy until his elevation in 1471 to be bishop of Carpentras, shortly after his uncle succeeded to the papal chair. In the same year he was promoted to be cardinal, taking the same title as that formerly held by his uncle, St. Peter ad Vincula. With his uncle he obtained very great influence, and in addition to the archbishopric of Avignon he held no fewer than eight bishoprics. In the capacity of papal legate he was sent in 1480 to France, where he remained four years. On the death of Alexander VI. in 1503 Della Rovere supported the candidature of Cardinal Piccolomini of Milan, who was consecrated under the name of Pius III., but was then suffering from an incurable malady, of which he died in little more than a month afterward. Della Rovere then succeeded by dexterous diplomacy in winning the support of Cæsar Borgia, and was elected to the papal dignity by the unanimous vote of the cardinals. From the beginning Julius II. set himself with a courage and determination rarely equaled to rid himself of the various powers under which his temporal authority was almost overwhelmed. By a series of complicated stratagems he first succeeded in rendering it impossible for Borgia to remain in the papal states. He then used his influence to reconcile the two powerful houses of Orsini and Colonna, and, by decrees made in their interest, he also attached to himself the remainder of the nobility. Being thus secure in Rome and the surrounding country, he next set himself to oust the Venetians from Faenza, Rimini, and the other towns and fortresses of Italy which they occupied at the death of Alexander VI. Events in other respects so favored his plans that in 1508 he was able to conclude with Louis XII., the emperor Maximilian, and Ferdinand of Aragon the famous league of Cambria against the Venetian republic. In the spring of the following year the republic was placed under an interdict. The results of the league soon outstripped the primary intention of Julius. By the single battle of Agnadello the dominion of Venice in Italy was practically lost; but, as neither the king of France nor the emperor was satisfied with merely effecting the purposes of the pope, the latter found it necessary to enter into a combination with the Venetians to defend himself from those who immediately before had been his allies against them. The Venetians on making humble submission were absolved in the beginning of 1510, and shortly afterward France was placed under the papal ban. Attempts to bring about a rupture between France and England proved unsuccessful; on the other hand, at a synod convened by Louis at Tours in September, 1510, the French bishops withdrew from the papal obedience, and resolved, with Maximilian's coöperation, to seek the deposition of Julius. In November, 1511, a council actually met for this object at Pisa. Julius hereupon entered into the Holy League with Ferdinand of Aragon and the Venetians against France, in which both Henry VIII. and the emperor ultimately joined. He also convened a general council (that afterward known as the Fifth Lateran) to be held at Rome in 1512, which, according to an oath taken on his election, he had bound himself to summon, but which had been delayed, he affirmed, on account of the occupation of Italy by his enemies. In 1512 the French were driven across the Alps, but it was at the cost of the occupation of Italy by the other powers, and Julius, though he had securely established the papal authority in the states immediately around Rome, was practically as far as ever from realizing his dream of an independent Italian kingdom when he died of fever in February, 1513.

JULIUS III., pope from 1550 to 1555, was born at Rome in 1487. He was of good family, his original name being Gian Maria del Monte. After attaining the dignity of archbishop of Siponto, he was in 1536 created cardinal by Paul III., by whom he was employed on several important legations; he was one of the presidents of the council of Trent during its session at Bologna in April, 1547. In 1550 he was unanimously chosen successor of Paul III. He consented, at the request of the emperor Charles V., to the reopening of the council of Trent (in 1551), and he also entered into a league with him against the duke of Parma and Henry II., of France; but soon afterward he deemed it advisable to make terms with his enemies, and in 1552 he again suspended the meetings of the council. He was succeeded by Marcellus II.

JULY, the seventh month in our present calendar, consists of thirty-one days. It was originally the fifth month of the year, and as such was called by the Romans *Quinctilis*. The later name of Julius was given in honor of Julius Cæsar (who was born in the month), and came into use in the year of his death.

JUMET, or JUMETZ, a town and commune of Belgium, in the arrondissement of Charleroi and the province of Hainault, is situated about four miles northeast of Charleroi. Its manufactures include glass bottles, knives, nails, and hats; and there are extensive coal-mines in the neighborhood. The population of the commune is 20,102.

JUMIÈGES or JUMIÉGES, a village of France, in the department of Seine Inférieure and arrondissement of Rouen, about sixteen miles southwest of Rouen, in one of the peninsulas formed by the winding of the Seine.

JUMILLA, a town of Spain, in the province of Murcia, is situated thirty-seven miles north-northwest of Murcia, at the foot of a hill whose summit is crowned by a citadel. Population, 15,000.

JUMNA or JAMUNÁ, one of the largest rivers of northern India, rises in the Himálayas in Garhwál state, about five miles north of Jamnotri hot springs, and falls into the Ganges three miles below Allahábád city. The Jumna, after issuing from the hills, has a longer course through the Northwestern provinces than the Ganges, but it is not so large nor so important a river; and above Agra in the hot weather it dwindles to a small stream.

JUNAGARH, a native state in Káthiáwár in the province of Guzerat, Bombay presidency, India. The state, which comprises an estimated area of 3,800 square miles, consists of a level plain, with the exception of the Gírnar group of hills, sacred to Jainism, the highest peak of which rises to about 3,500 feet above sea-level. Population, 400,000.

JUNE, the sixth month in our present calendar, consists of thirty days. Ovid, in his *Fasti* (vi. 25), makes Juno assert that the name was expressly given in her honor. In another part of the *Fasti* (vi. 87) he gives the derivation *a junioribus*, as May had been derived from *Majores*. Others connect the term with the gentile name Junius, or with the consulate of Junius Brutus. Probably, however, it has an agricultural reference, and originally denoted the month in which crops grow to ripeness. In the old Latin calendar June was the fourth month, and in the so-called year of Romulus it is said to have had thirty days; but at the time of the Julian reform of the calendar its days were only twenty nine. To these Cæsar added the thirtieth, which it still retains.

JUNG, JOHANN HEINRICH, best known by his assumed name of HEINRICH STILLING, charcoal-burner, tailor, village schoolmaster, oculist, professor of political science, and mystic, was born in the village of Grund in the duchy of Nassau, on September 12, 1740. He became tutor in the family of a merchant, and in 1768 went with "half a French dollar," as he himself tells us, to study medicine at the university of Strasburg. At Strasburg he met Goethe, who showed him much kindness, and introduced him to Herder. The acquaintance with Goethe ripened into friendship; and it was by his influence that Stilling's first and best work, *The Account of his Youth*, was in 1777 given to the world. In 1772 he settled at Elberfeld as physician and oculist, and soon became celebrated for operations in cases of cataract. In 1786, on the occasion of the anniversary of the fourth centenary of Heidelberg university, Stilling created immense enthusiasm by delivering his speech, the last of the day, in German. The other professors had used Latin. In 1787 Stilling was appointed professor of economical, financial and statistical science in the university of Marburg. In 1803 he resigned his professorship and returned to Heidelberg, where he remained with no official appointment until 1806. In that year he received a pension from the grand-duke Charles Frederick of Baden, and removed to Carlsruhe, where he remained until his death on April 2, 1817.

JUNGFRAU ("the Maiden"), a magnificent peak of the Bernese Alps, attains a height of 13,671 feet. It received its name either from the unsullied purity and dazzling brightness of the snow by which it is covered, or from the fact that no traveler had ever reached its highest point. Its summit was first ascended by two Swiss gentlemen, named Meyer, in 1811. In 1890 a railway from Lauterbrunnen to its summit was projected.

JUNGLE, a term now fully adopted into the English language from Bengal (Sanskrit *jangala*, "desert"), and employed to designate those thickets of trees, shrubs and reeds which abound in many parts of India, and particularly in the unhealthy tract called Terai or Tarayani, along the southern base of the Himalayas, and in the Sundarbans at the mouth of the Ganges. The jungles are often impassable, from the thick growth of underwood, tall grasses, and climbing plants. The soil is generally swampy, and fever and other diseases abound. Tigers and other beasts of prey, elephants, boars, deer, and other quadrupeds may be found in great numbers in these thickets, with gigantic snakes and multitudes of monkeys. The jungle flora and fauna are very peculiar, and the moisture and heat carry a tropical vegetation beyond its usual limits northward to the lower valleys of the Himalayas.

JUNIPER. The junipers, of which there are about twenty-five species, are evergreen bushy shrubs or low columnar trees, with a more or less aromatic odor, inhabiting the whole of the cold and temperate northern hemisphere, but attaining their maximum development in the temperate zone in North America and Europe. *Juniperus bermudiana*, a tree about forty or fifty feet in height, yields a fragrant red wood, which was used for the manufacture of "cedar" pencils. The tree is now very scarce in Bermuda, and the "red cedar," *juniperus virginiana*, of North America is employed instead for pencils and cigar boxes. The red cedar is abundant in some parts of the United States, and in Virginia is a tree fifty feet in height. It is very widely distributed, from the great lakes to Florida and around the Gulf of Mexico, and extends as far west as the Rocky Mountains. The wood is applied to many uses in the United States. The fine red fragrant heart-wood takes a high polish, and is much used in cabinet work and inlaying, but the small size of the planks prevents its more extended use. The tops of the young branches are officinal in the United States pharmacopœia. The galls produced at the ends of the branches have also been used in medicine, and the wood yields cedar-camphor and oil of cedar-wood. The genus occurs in a fossil state, four species having been discovered in rocks of the tertiary period.

JUNIUS. This is the signature of an unknown writer who, after exciting and baffling the curiosity of three or four generations of critics, has been allowed to take rank among English classics under a pseudonym.

The first of the published letters with this signature was dated January 21, 1769; the last January 21, 1772. The entire series appeared in the *Public Advertiser*, a popular newspaper edited by Woodfall, to whom a number of private letters were also addressed by the same writer. These are included in the collected and complete editions, as well as a number of letters attributed on varying grounds, more or less satisfactory, to Junius.

The first of the letters was a sweeping attack on the government for the time being. Its spirit may be judged from the concluding sentence: "They (posterity) will not believe it possible that their ancestors could have survived or recovered from so desperate a condition while a duke of Grafton was prime minister, a Lord North chancellor of the exchequer, a Weymouth and a Hillsborough secretaries of state, a Granby commander-in-chief, and a Mansfield chief criminal judge of the kingdom." He does not condescend to particulars, and the letter might have passed unnoticed if Sir William Draper, a man of considerable note, had not undertaken the defense of Lord Granby in answer to it. A bitter controversy ensued, which rapidly degenerated into an exchange of personalities, much to the disadvantage of Sir William. Then came letters to the duke of Grafton, the prime minister, directed more against his private character and conduct than his policy, the main charge against his Grace being his abandonment of Wilkes, whom Junius treats throughout the letters as the champion of the constitution, to be supported against the ministry and the crown. He takes Blackstone, the author of the *Commentaries*, severely to task for justifying the expulsion of Wilkes, whose cause he also espouses in an altercation with Horne Tooke; and he omits no opportunity of denouncing Luttrell, the elect of Middlesex. The address to the king, the most celebrated of Junius' compositions, after recapitulating the familiar charges of personal pique and favoritism, calls upon his Majesty to summon his whole council without consulting his minister: "Lay aside the wretched formality of a king, and speak to your subjects with the spirit of a man and in the language of a gentleman. Tell them you have been fatally deceived." Many of the letters turn on topics which have no longer the slightest interest. Junius relies little on argument or proof. His force is in his style. He commonly assumes his victim to be what he wishes him to be thought, and produces the desired effect by irony, sarcasm, or polished invective. One of his happiest figures of speech is in the letter on the affair of the Falkland Islands: "Private credit is wealth; public honor is security; the feather that adorns the royal bird supports his flight; strip him of his plumage, and you fix him to the earth." Although an admirer of Lord Chatham, Junius agreed with Mr. Grenville as to the right of England to tax the colonies; and although an uncompromising supporter of popular rights, he was an advocate or apologist for rotten boroughs.

The sensation Junius created in the political world may be inferred from the manner in which the leading orators and statesmen of the day spoke of him. "How comes this Junius," exclaimed Burke, addressing the Speaker, "to have broke through the cobwebs of the law, and to range, uncontrolled, unpunished, through the land? The myrmidons of the court have been long, and are still, pursuing him in vain. They will not spend their time upon me or you. No, sir, they disdain such vermin when the mighty boar of the forest who has broke through all their toils is before them. But what will all their efforts avail? No sooner has he wounded one than he lays down another dead at his feet. For my part, when I read his attack upon the king, I own my blood ran cold." * * * "Nor has he dreaded the terrors of your brow, but he has attacked even you—he has—and I believe you have no reason to triumph in the encounter. In short, after carrying away our royal eagle in his pounces and dashing him against a rock, he has laid you prostrate. King, lords, and commons are but the sport of his fury. Were he a member of this House, what might not be expected from his knowledge, his firmness, and integrity? He would be easily known by his contempt of all danger, by his pointed penetration and activity." Lord North spoke in the same strain: "Why should we wonder that the great boar of the wood, this mighty Junius, has broke through the toils and foiled the hunters? Though there may be at present no spear that will reach him, yet he may be some time or other caught."

What added signally to his influence was the general belief of his contemporaries that he was a man of rank and position, familiar with what was passing behind the scenes in high places; and this belief arose not simply from the intimate knowledge he showed of things and persons about the court and the principal departments of the state, but from the lofty and independent tone that was habitual and seemed natural to him—as when he tells Sir William Draper, "I should have hoped that even my name might carry some authority with it if I had not seen how very little weight or consideration a printed paper receives even from the respectable signature of Sir William Draper;" or when in private letters to the publisher, after waiving all right to the profits of the publication, he says: "As for myself, be assured that I am far above all pecuniary views." * * * "You, I think, sir, may be satisfied that my rank and fortune place me above a common bribe."

In the preface to the second volume of Bohn's edition of 1855, no less than thirty-seven persons are enumerated to whom the authorship has been attributed. Contemporary opinion strongly inclined to Burke, whose power of assuming or disguising style is proved by his *Vindication of Natural Society*. Doctor Johnson, who had entered the lists against Junius, told Boswell: "I should have believed Burke to be Junius, because I know no man but Burke who is capable of writing these letters; but Burke spontaneously denied it to me." Burke told Reynolds that he knew Junius, and uniformly spoke of him as he would hardly have spoken of himself. A very strong case was made out for Lord George Sackville, on whom, after Burke's denial, Sir William Draper's suspicions permanently fixed. Fox used to say that, although he would not take "Single-speech" Hamilton against the field, he would back him against any single horse. Boyd is another candidate who did not lack supporters. A plausible claim was advanced for the American General Lee, backed by three experts who pretended to detect him by the handwriting. A famous expert, Imbert, gave a written certificate on the same ground in favor of Horne Tooke; and another, Netherclift, declared that there was more of the Junius character in the handwriting of Mrs. Dayrolles (the alleged amanuensis of Lord Chesterfield) than in any other specimen submitted to him as a possible performance by the great unknown. Other experts declared confidently for other claimants. But the identity remained an open question, and case after case was pronounced not proven, till the appearance of Mr. Taylor's *Junius Identified* in 1816, when Sir Philip Francis immediately became the favorite, and during the next half century the problem was pretty generally considered at an end.

Pitt told Lord Aberdeen (the fourth earl) that he knew who Junius was, and that it was not Francis. On its being objected that the Franciscan theory had not been started till after Pitt's death, Lord Aberdeen replied "*That's stuff*," and proceeded to relate that he himself had once dined in company with Francis when proofs of his being Junius were adduced before him, that he had listened with evident pleasure, and at last exclaimed in a stilted, theatrical manner, "God! if men force laurels on my head, I'll wear them." His immediate contemporaries remained unconvinced. Sir Fortunatus Dwarris states broadly that no one who knew, heard, or read Francis thought him capable of producing Junius. Lord Broughton confirmed this. Tierney said: "I know no better reason for believing the fellow to be Junius than that he was always confoundedly proud of something, and no one could ever guess what it could be."

Lord Stanhope, however, would admit no shadow of doubt upon the point, and Lord Macaulay declared that all reasoning from circumstantial evidence was at an end unless Francis were admitted to be Junius. Both these eminent authorities agree in resting their case on similarity of handwriting, on the internal evidence of style, and on five points which are summarily stated by Lord Macaulay in his essay on Warren Hastings.

The five points (which have been logically resolved into three) remained untouched till the publication of the memoirs of Sir Philip Francis by Parkes and Merivale in 1867. This book entirely changed the aspect of the controversy by showing that Francis' position, opinions, interests, manner of life, and tone during the Junian period were the reverse of what those of Junius might be supposed to have been.

One of Lord Macaulay's five points is that Junius was "bound by some strong tie" to the first Lord Holland, the friend of Doctor Francis and the early patron of Philip. Now, in a fragment of autobiography (included in the memoirs) it is stated that, long before the Junius letters, Doctor Francis considered himself grossly ill-used by Lord Holland, and "was stung with the idea of having been so long the dupe of a scoundrel." Another point, and a most important one, is that Francis bitterly resented the appointment (over his head) of Mr. Chamier to the place of deputy secretary at war, and that to the resentment thus aroused was owing the downright ferocity, brutal abuse (as Mr. Merivale calls it), with which Lord Barrington was assailed by Junius under the signature of Veteran. Laying out of the account the fact that Lord Barrington had been the object of Junius' unrelenting attacks for more than two years before the appointment of Chamier, it is sufficient to refer to Francis' letter of January 24, 1772, to Major Baggs, in which he says: "You will have heard that Mr. D'Oyly has resigned his employment (of deputy). He did it while I was at Bath. Immediately upon my return, my Lord Barrington was so good as to make me the offer with many obliging and friendly expressions. I had, however, solid reasons for declining the offer, and Mr. Anthony Chamier is appointed."

That Earl Temple wrote or inspired Junius is a theory which has been maintained in two able essays, and it derives plausibility from Pitt's assertion that he knew who Junius was, as well as from the language of the Grenville family, which all points to Stowe as the seat of the mystery. The Right Hon. T. Grenville told the first duke of Buckingham, who thought he had discovered the secret, that it was no news to him, but for family reasons the secret must be kept. He also stated to other members of the family, subsequently to the publication of *Junius Identified*, that Junius was not either of the persons to whom the letters had been popularly ascribed. Lord Grenville told Lord Sidmouth that he (Lord G.) knew who Junius was. Lady Grenville told Sir Henry Holland and Dr. James Ferguson that she had heard Lord Grenville state that he knew who Junius was, and that it was not Francis. The handwriting of Countess Temple (supposed to have acted as the amanuensis of her lord) comes far the nearest to the Junian hand of any that have been produced as similar to it, especially as regards powers of penmanship. The authorship of the letters remains a mystery, and *Stat Nominis Umbra* is still the befitting motto for the title-page.

JUNIUS, FRANCISCUS, in French François du Jon, Huguenot divine and writer, was born of good family at Bourges, in France, May 1, 1545. In 1565 he was appointed minister of the Walloon congregation at Antwerp. His foreign birth excluded him from the privileges of the native Reformed pastors, and exposed him to the persecutions of Margaret of Parma, governess of the Netherlands. Several times he barely escaped arrest, and finally, after spending six months in preaching at Limburg, he was forced to retire to Heidelberg in 1567. There he was welcomed by the elector Frederick, and temporarily settled in charge of a church at Schönau; but in 1568 his patron sent him as a chaplain with the prince of Orange in his unfortunate expedition to the Netherlands. Junius escaped as soon as he could from the post, and returning to his church remained there till 1573. From 1573 till 1578 he was at Heidelberg, assisting Tremellius in his Latin version of the Old Testament, which appeared at Frankfort in 1578; and after two and a half years distributed between Neustadt and Otterburg he was appointed to the chair of divinity at Heidelberg. He died October 13, 1602.

JUNIUS, FRANCISCUS (1589-1677), an eminent scholar, son of the foregoing, was born at Heidelberg.

JUNK, a Chinese vessel, often of large dimensions. It has a high forecastle and poop, and ordinarily three masts. Junks, although clumsy vessels incapable of much seamanship or speed, have proved themselves seaworthy on voyages extending even to America and Europe.—*Junk*, in the British navy, is a familiar term for the salt meat supplied to vessels for long voyages—the name being probably derived from the fact that it becomes as hard and tough as old rope, pieces of which are officially styled *junk*.

JUNKERS, the name commonly given to the younger members of the squirearchy or landed gentry of Prussia and the adjoining states.—*Junkerthum* was a term of reproach used in the middle of the nineteenth century to designate the party of reaction in Prussia, which found its most strenuous supporters among the landed gentry.

JUNO, one of the chief goddesses of the Roman state, was identified through the influence of Greek religion with the Hellenic goddess Hera. It is exceedingly unlikely that this identification is grounded on any real connection between the two, as is the case with Zeus and Jupiter (see JUPITER); it was suggested solely by some superficial points of resemblance. There was a certain analogy in the relation which they respectively bore to the chief god; but it is probable that the marriage of Jupiter and Juno is not a native but a borrowed idea. In Latin and in modern literature the character of Juno is wholly that of the Greek Hera (see HERA). The opinion is general that Juno is not an Aryan goddess, but adopted from a non-Aryan race; if so, she must be Etruscan. One of the chief cults of Juno in Rome was that of Juno Regina on the Aventine. She had been brought hither by Camillus when Rome conquered the Etruscan city of Veii and adopted its patron goddess Juno. The Etruscan name is apparently Uni. Another great seat of the worship of Juno was Lanuvium. When that city was conquered, the cultus of Juno Sospita was carried to Rome and established on the Palatine hill. Had Juno been an Aryan goddess, we should certainly find a strong naturalistic element in her; but in fact her sphere is almost entirely limited to human life and action. She must, therefore, have been adopted from some civilized race, where the moral side of the divine conception had been developed, and the naturalistic element, which originally belongs to all deities, had lost prominence. At Veii, Lanuvium, and other places Juno was the protecting goddess of the state and of society, and in a similar way she had been worshiped at Rome from the earliest times under the epithets Curiatia and Populona.

JUNOT, ANDOCHE, Duc d'Abrantés, was born at Bussy-le-Grand, October 23, 1771. He went to school at Chatillon, and was known among his comrades as a blustering but lovable creature, with a pugnacious disposition. He came under the special notice of Napoleon during the siege of Toulon, while serving as his secretary. He accompanied Napoleon to Italy in the capacity of aide-de-camp, and distinguished himself so much at the battle of Millesimo that he was selected to carry back the captured colors to Paris. Returning to Italy he went through the campaign with honor, but was badly wounded in the head at Lonato. From the effects of the wound he never completely recovered, and many rash incidents in his career may be directly traced to it. During the expedition to Egypt he acted as general of brigade, and went through fourteen brilliant hours of fighting at Nazareth, putting 10,000 Turks to flight with 300 troopers. His devotion to Napoleon involved him in a duel with General Lanusse, in which he was again wounded. He had to be left in Egypt to recover, and in crossing to France was captured by English cruisers. On his return to France he was made commandant of Paris, and afterward promoted general of division. He next served at Arras in command of the grenadiers of the army destined for the invasion of England, and made some alterations in the equipment of the troops which received the praise of the emperor. It was, however, a bitter mortification that he was not appointed a marshal of France when he received the cross of the Legion of Honor. He was sent to Lisbon instead, his entry into which city was something like a royal progress, though his vanity was disappointed by the mission. He was so restless and dissatisfied in the Portuguese capital that he set out, without leave, for the army of Napoleon, and at Austerlitz behaved with conspicuous courage and zeal. But he soon offended the emperor by his manner and his demands, and was sent to Parma to put down an insurrection and to be out of the way. In 1806 he was recalled and became governor of Paris. His extravagance and prodigality shocked the Government, and some rumors of an intrigue with Joséphine made it desirable again to send him away. He was, therefore, appointed to lead an invading force into Portugal. For the first time Junot had a great task to perform, and only his own resources to fall back upon for its achievement. Early in November, 1807, he set out from Salamanca, crossed the mountains of Beira, rallied his broken forces at Abrantès, and, with 1,500 men, dashed upon Lisbon. The whole movement only took a month; he was then invested with the governorship. Administration was his weak point, and in a short time, instead of consolidating the results of his victory, he had squandered them by a course of conduct like that of an Eastern monarch. After Wellesley encountered him at Vimiera he was obliged to withdraw from Portugal with all his forces. Napoleon disapproved, but sent him back to Spain, where, acting under Massena, he was once more seriously wounded. His last campaign was made in Russia, and he got more than a just share of the discredit which attached to it. Napoleon next appointed him to govern Illyria. On July 29, 1813, he threw himself from a window at Montbard, in a fit of insanity

JUNOT, LAURE PERMON, Duchesse d'Abrantès, was born at Montpellier, November 6, 1784. Her father was an army contractor, who allowed his wife to take his daughters to Paris in order that they might make good matches. They were lively, witty young ladies, and soon attracted to their hôtel a mixed society of officers. Madame Junot declared that Napoleon wished to marry her mother; but there is no evidence for the truth of the story. But he gave Laure Permon 100,000 francs when she married Junot, and after the birth of her first child a house in the Champs-Élysées, with 100,000 francs to furnish it. Her husband had extravagant tastes; but she was extravagant to recklessness, contracting debts as rapidly as tradesmen would allow her to run them up. In 1805 she went with her husband to Lisbon, and, as she took it on her to represent "female France," her train was more expensive than that of a queen. After she returned to Paris, she renewed her extravagance, and, opening her drawing-room to the older families as well as to the new men of the empire, she fell under suspicion. With Junot she went through the Spanish campaign, and contrived to give pleasant balls and to hold drawing-rooms all along the route. After her husband's death she was forbidden to return to Paris, but she ignored Napoleon's order, returned, opened her house again, and attracted to it all the celebrities of the day. Her poverty compelled her to retire to L'Abbaye-aux-Bois when the empire ended; but she devoted herself to literature with much zeal. She made social recollections from her own life the chief subject; her style was free and flowing; and her articles, memoirs, and romances were widely read. She died at Paris, June 7, 1838.

JUPITER was the chief god of the Roman state. The great and constantly growing influence exerted from a very early period on Rome by the superior civilization of Greece not only caused a modification of the Roman god after the analogy of Zeus, the supreme deity of the Greeks, but led the Latin writers to identify the one with the other, and to attribute to Jupiter myths which were purely Greek and never belonged to actual Roman religion. The Jupiter of actual worship was a Roman god; the Jupiter of Latin literature was more than half Greek. From the Latin this composite deity has passed into modern literature, and under the name of Jupiter is understood a god whose character is half Roman half Greek; while the legends, family history, and posterity attributed to him are wholly Greek. The identification was facilitated by the community of character which really belonged to Jupiter and Zeus as the Roman and Greek developments of the original Aryan conception of God; whereas the analogy between the non-Aryan Juno of Rome and the Aryan Hera of Greece was very slight.

JURA. This range may be roughly described as the block of mountains rising between the Rhine and the Rhone, and forming the frontier between France and Switzerland. The gorges by which these two rivers force their way to the plains cut off the Jura from the Swabian and Franconian ranges to the north and those of Dauphiné to the south. But in very early days, before these gorges had been carved out, there were no openings in the Jura at all, and even now its three chief rivers—the Doubs, the Loue, and the Ain—flow down the western slope, which is both much longer and but half as steep as the eastern. Some geographers extend the name Jura to the Swabian and Franconian ranges between the Danube and the Neckar and the

Main; but, though these are similar in point of composition and direction to the range to the south, it is most convenient to limit the name to the mountain ridges lying between France and Switzerland, and this narrower sense will be adopted here.

The Jura has been aptly described as a huge plateau about 156 miles long and thirty-eight miles broad, hewn into an oblong shape, and raised by internal forces to an average height of from 1,950 to 2,600 feet above the surrounding plains. The shock by which it was raised, and the vibration caused by the elevation of the great chain of the Alps, produced many transverse gorges or "cluses," while on the plateaus between these subaërial agencies have exercised their ordinary influence.

Geologically, the sedimentary rocks of the Jura belong to the Mesozoic age, and were deposited in a sea of variable depth, traces of which survive in the vast salt-mines from which Salins and Lons-le-Saunier derive their names. The special name of these fossilliferous strata is Oolitic; they are also called Jurassic, from the fact that the Jura is entirely made of such layers.

The general direction of the chain is from northeast to southwest, but a careful study reveals the fact that there were in reality two main lines of upheaval, viz., north to south and east to west, the former best seen in the southern part of the range and the latter in the northern; and it was by the union of these two forces that the lines northeast to southwest (seen in the greater part of the chain), and northwest to southeast (seen in the Villebois range at the southwest extremity of the chain), were produced.

The name Jura, which occurs in Cæsar and in Strabo, is a form of a word which appears under many forms (*e.g.*, Joux, Jorat, Jorasse, Juriens), and is a synonym for a wood or forest. The German name is *Leberberg*, *Leber* being a provincial word for a hill.

Politically the Jura is French (departments of the Doubs, Jura, and Ain) and Swiss (parts of the cantons of Geneva, Vaud, Neuchâtel, Bern, Solothurn, and Basel), but at its north extremity it takes in a small bit of Alsace (Pfirt or Ferrette).

JURA, an eastern frontier department of France, formed of the southern portion of the old province of Franche-Comté, owes its name to the offshoots and plateaus of the Jura mountains, which occupy more than half its area. It is bounded north by the Doubs, Haute-Saône, and Côte-d'Or; east by Doubs, Ain, and Switzerland; south by Ain; and west by Saône-et-Loire and Côte-d'Or. Its greatest length from north to south is 143 miles, and its greatest breath from east to west eighty-three miles. The department is divided by a not very broad zone of hills into a region of plain in the north and northwest, and a region of mountains in the southeast, increasing in height toward the Swiss frontier. Jura belongs almost entirely to the basin of the Rhone—its chief streams being the Oignon, Doubs, and Seille, affluents of the Saône, and the Ain and Valserine, direct tributaries of the Rhone. The Doubs and Ain are navigable. There are numerous lakes; those of Rousses, Châlin, Chambly, and of the abbey of Grandvaux are noteworthy. The climate is, on the whole, cold; the temperature is subject to sudden and violent changes and among the mountains winter lingers for nearly six months. Jura is one of the most thickly wooded departments of France: a third of its surface is covered with forests, of which that of Chaux, with an area of about seventy-five square miles, is the largest. The commonest trees are oaks, beeches, hornbeams, aspens, birches, box-trees, and firs. Wolves and foxes are numerous in Jura; wild boars and deer lurk in the forests. The principal minerals are iron, salt, limestone, marble, sandstone, millstone, and clay. Peats are very abundant. Agriculture employs about three-fourths of the inhabitants. The department of Jura embraces the arrondissements of Lons-le-Saunier, Dôle, Poligny, and St. Claude, with thirty-two cantons and 583 communes. Lons-le-Saunier is the chief town. The total area is about 1,928 square miles; the population (1901) was 259,212.

JURA, an island of the inner Hebrides, on the west coast of Argyllshire, Scotland, the fourth largest of the group. On the north it is separated from the island of Scarba by the whirlpool of Corryvreckan, on the east from the mainland by Jura Sound, which is ten miles broad, and on the south and southwest from Islay by Islay Sound. The area is about 160 square miles, the greatest length about twenty-seven miles, and the breadth about six.

JURIEU, Pierre, a French Protestant theologian, was born in 1637 at Mer, in Orléanais, where his father was a Protestant pastor. He studied at Saumur and afterward at Sedan under his maternal grandfather, the famed theologian Pierre Dumoulin, who died about the time that Jurieu left Sedan. After completing his studies in England under his maternal uncle Dumoulin, Jurieu received episcopal ordination there, and returning to France succeeded his father as pastor of the church at Mer. In 1674 he accepted the chair of theology and Hebrew at Sedan, where he soon afterward became also pastor. Both as preacher and professor he obtained a very high reputation, but much of the legitimate influence of his talents was destroyed by the extreme warmth of his controversial temper, which frequently developed into an irritated fanaticism verging on insanity. On the suppression of the university of Sedan in 1681, Jurieu received an invitation to a church at Rouen, but, dreading persecution on account of a work he was about to publish, entitled *La Politique du Clergé de France*, he went to Holland and became soon after pastor of the Walloon church of Rotterdam, an office which he occupied till his death, January 11, 1713.

JURISPRUDENCE. See Law.

JURY. The essential features of trial by jury as practiced in England and countries influenced by English ideas are the following:—The jury are a body of laymen selected to ascertain, under the guidance of a judge, the truth in questions of fact arising either in a civil litigation or in a criminal process. They are generally twelve in number, and their verdict, as a general rule, must be unanimous. Their province is strictly limited to questions of fact, and within that province they are still further restricted to the exclusive consideration of matters that have been proved by evidence in the course of the trial. They must submit to the direction of the judge as to any rule or principle of law that may be applicable to the case; and, even in deliberating on the facts, they receive, although they need not be bound by, the directions of the judge as to the weight, value, and materiality of the evidence submitted to them. Further, according to the general practice, they are selected from the inhabitants of the locality, whether county or city, within which the cause of action has arisen or the crime has been committed, so that they bring to the discharge of their duties a certain amount of independent local knowledge, an element in the institution which is by no means to be ignored. Such in general terms is the famous judicial institution the development of which is generally regarded as one of the greatest achievements of English jurisprudence.

Trial by jury according to the English system has been incorporated into the constitution of the United States. There was at one time some controversy as to whether the civil jury was included or not. The three articles (III., V., and VI.) in which allusion to trial by jury is made refer to criminal proceedings only, and, moreover, the supreme court is declared to have appellate jurisdiction both as to law and *fact*. It has accordingly been provided by one of the amendments to the constitution that, in suits at common law where the value in controversy shall exceed twenty dollars, the right of trial by jury shall be preserved; and no fact tried by a jury shall be otherwise reëxamined in any court of the United States than according to the rules of the common law. Throughout the Union in all trials, whether civil or criminal, unanimity in the jury is essential.

JUSSIEU, DE, the name of a distinguished French family, which came into prominent notice toward the close of the sixteenth century, and for a century and a half was illustrious for the botanists it produced. The following are its most eminent members:—

I. ANTOINE DE JUSSIEU (1686–1758), born at Lyons, was the earliest in point of time of the line of distinguished botanists of his name.

II. BERNARD DE JUSSIEU (1699–1777), a younger brother of the above, was also born at Lyons. He was educated for the medical profession, took his doctor's degree at Montpellier, commenced practice in 1720, and on his brother's invitation he joined him in Paris in 1722. He succeeded Vaillant as sub-demonstrator of plants in the Jardin du Roi, and his principal duties consisted in superintending the herborizations of the students. His knowledge of plants and even of non-botanical subjects was so great that he readily detected and named the component parts of made-up plants which were sometimes submitted to him. Long before Tremblay published his *Histoire des polypes d'eau douce*, he maintained the doctrine that these organisms were animals, and not the flowers of marine plants, then the current notion; and to confirm his views he made three journeys to the coast of Normandy. Singularly modest and retiring, he published very little, but in 1759 he arranged the plants in the royal garden of the Trianon at Versailles, according to his own scheme of classification.

III. JOSEPH DE JUSSIEU (1704–1779), brother of Antoine and Bernard, was born at Lyons. Educated like the rest of the family for the medical profession, he accompanied La Condamine to Peru, in the expedition for measuring an arc of meridian, and remained in South America for thirty-six years, returning to France in 1771.

IV. ANTOINE LAURENT DE JUSSIEU (1748–1836), nephew of the three preceding, was born at Lyons. Called to Paris by his uncle Bernard, and carefully trained by him for the pursuits of medicine and botany, he largely profited by the opportunities afforded him. Gifted with a tenacious memory, and the power of quickly grasping the salient points of subjects under observation, he steadily worked at the improvement of that system of plant-arrangement which had been sketched out by his uncle.

V. ADRIEN (LAURENT HENRI) DE JUSSIEU, son of Antoine Laurent, was born at Paris, December 23, 1797. He was the author of valuable contributions to botanical literature on the *Rutaceæ*, *Meliaceæ*, and *Malpighiaceæ* respectively, of "Taxonomie" in the *Dictionnaire universelle d'histoire naturelle*, and of an introductory work styled simply *Botanique*, which reached nine editions, and has been translated into the principal languages of Europe. He died at Paris, June 29, 1853, leaving two daughters, but no son, so that with him closed the brilliant botanical dynasty.

VI. LAURENT (PIERRE) DE JUSSIEU. This miscellaneous writer, nephew of Antoine Laurent, was born at Villeurbanne, February 7, 1792. *Simon de Nantua, ou le marchand forain*, Paris, 1818, reached fifteen editions, and has been translated into seven languages. He died in 1866.

JUSTICE, in law, has long been the official title of the judges of two of the English superior courts of common law, and it is now extended to all the judges in the Supreme Court of Judicature—a judge in the High Court of Justice being styled Mr. Justice, and in the Court of Appeal Lord Justice.

In the United States the supreme court consists of a chief justice and eight associate justices, any five of whom make a quorum. The salary of the chief justice is $10,500, and that of the associates $10,000 each.

JUSTICE OF THE PEACE is an inferior magistrate appointed in England by special commission under the great seal to keep the peace within the county for which he is appointed. "The whole Christian world," said Lord Coke, "had not the like office as justice of the peace if duly executed." Lord Cowper, on the other hand, describes them as "men sometimes illiterate and frequently bigoted and prejudiced." The truth is that justices of the peace perform without any other reward than the consequence they acquire from their office a large amount of work indispensable to the administration of the law, and for the most part they discharge their duties with becoming good sense and impartiality. But being chosen from the limited class of country gentlemen in counties, they are sometimes exposed to the suspicion of the general public, particularly when they have to administer laws which are considered to confer special privileges on their own class. Further, as they do not generally possess a professional knowledge of the law, their decisions are occasionally inconsiderate and ill-formed. In great centers of population, when the judicial business of justices is heavy, it has been found necessary to appoint paid justices or stipendiary magistrates to do the work, and an extension of the system to the country districts has been often advocated.

In the United States these officers are sometimes appointed by the executive, sometimes elected. In some, perhaps all, of the United States, justices of the peace have jurisdiction in civil cases given to them by local regulations.

JUSTICIARY, HIGH COURT OF, in Scotland, is the supreme criminal court, and consists of five of the lords of session, together with the lord justice-general and the lord justice-clerk as president and vice-president respectively.

JUSTIN, Martyr and Apologist as he is usually called, was an able and eloquent advocate of Christianity in the second century. Almost all we know about him is told us in his own writings. He was born in Palestine, at Flavia Neapolis, the ancient Shechem, now Nábulus. The names of his father Priscus and grandfather Bacchius suggest that he was of Latin descent, and some passages in his writings seem to say that his parents were heathens. He relates his own conversion in two passages. In the one he says that he was drawn to Christianity because he saw the Christians dauntless in death; in the other he tells how chance intercourse with an aged stranger brought him to know the truth, but this passage may be allegorical. In the introduction to the dialogue with Trypho, Justin describes various systems of pagan philosophy and his relation to them. At first he associated with the Stoics; from them he went to a Peripatetic, then to a Pythagorean; and at length he embraced the doctrines of Platonism. His Platonism clung to him through life, and curiously colored many of his Christian speculations. We know little about Justin's life after his conversion. At Ephesus he held the famous disputation with Trypho the Jew, and in Rome he argued with Crescens the Cynic. If the *Cohortatio* be genuine, he also visited Alexandria and Cumæ. His martyrdom is well authenticated. In his second *Apology* Justin declares that he expected martyrdom, and that he believed that his opponent Crescens, silenced in public by his arguments, would do his best to get him thrown into prison and condemned to death; and this declaration is probably the reason why Eusebius, who often manufactures facts out of suppositions, asserts that Justin was slain through the plots of Crescens. An old martyrium, of unknown authorship, records the trial and death of a Justin, who is probably Justin Martyr, though there is no corroborative historical evidence. He was condemned and put to death on the same day. We cannot fix with any certainty the dates of Justin's birth and death. He was probably born near the beginning of the second century, and was martyred somewhere between 148 and 165.

JUSTIN, Latin historian, called in one MS. Justinus Frontinus, in another M. Junianus Justinus, in others simply Justinus, is known from his *Historiarum Philippicarum Libri XLIV.*, a work described by himself in his preface as a collection of the most important and interesting passages from the voluminous *Historiæ Philippicæ et totius Mundi Origines et Terræ Situs*, written in the time of Augustus by Trogus Pompeius. Of Justin's personal history absolutely nothing is known. The passage in his preface on which was based the belief that he lived under Antoninus Pius is spurious; but a reference to him by St. Jerome fixes his date at some point before the fifth century.

JUSTIN I., the elder, Roman emperor of the East from 518 to 527, was originally a Dacian peasant; but, enlisting under Leo I., he rose to be commander of the imperial guards of Anastasius. On the death of that emperor in 518, the wily Dacian, aged sixty-eight, used for his own election to the throne a sum of money that he had received for the support of another candidate. Though ignorant even of the rudiments of letters, Justin was sufficiently acute, and he was sensible enough to intrust the administration of state to his wise and faithful quæstor Procius, though his own experience dictated several improvements in military affairs. An orthodox churchman himself, he effected in 519 a reconciliation of the Eastern and Western Churches, after a schism of thirty-five years. The assassination of the orthodox general Vitalian, and the virulence of the bloody conflicts of the "blue" and "green" factions that convulsed the capital toward the end of Justin's reign, are attributed to the jealousy and intrigues of the emperor's nephew and successor, Justinian. In 522 a war broke out with Persia, in which Belisarius made his first historical appearance; it continued for some years without any definite results. In 522 also Justin ceded to Theodoric, the Gothic king of Italy, the right of naming the consuls, and in 525 he received from that Arian monarch a deputation, of which the pope, John I., was compelled to be the leader, to deprecate an edict issued by Justin in 523 against all heretics. On April 1, 527, Justin, at the request of the senate, assumed Justinian as his colleague, and on the 1st of the following August he died. Justin bestowed much care on the repairing of public buildings throughout his empire, and contributed large sums to repair the damage caused by a destructive earthquake at Antioch.

JUSTIN II., the younger, Roman emperor of the East from 565 to 578, was the nephew and successor of Justinian I. He availed himself of his influence as master of the palace, and as husband of Sophia, the niece of the late empress Theodora, to secure a peaceful election. The first few days of his reign—when he paid his uncle's debts, administered justice in person, and proclaimed universal religious toleration—gave bright promise, realization of which was prevented either by his feebleness or his caprice. The most important event of his reign was the invasion of Italy by the Lombards, who, entering in 568 under Alboin, in a few years made themselves masters of nearly the entire country. Justin's arrogance had insulted the embassies from the Persians and Avars, who had come to him in the first year of his reign; and in 572 war broke out with the former, and in 573 with the latter. Although he formed alliances with the Turks of Central Asia and with the Ethiopians of Arabia in the one case, and with the Austrian Franks in the other, the emperor's arms were unsuccessful in both wars. The temporary fits of insanity into which he fell warned him to name a colleague. Passing over his own relatives, he raised, on the advice of Sophia, the brave general Tiberius to be Cæsar in December, 574, and withdrew for his remaining years into retirement. Tiberius was advanced to the dignity of Augustus on September 27, 578, and Justin died on the fith of the following month.

JUSTINIAN I. (483–565). Flavius Anicius Justinianus, surnamed the Great, the most famous of all the emperors of the Eastern Roman empire, was by birth a barbarian, native of a place called Tauresium in the district of Dardania, a region of Illyricum, and was born, most probably, on May 11, 483. His family has been variously conjectured, and, on the strength of the proper names which its members are stated to have borne, to have been Teutonic or Slavonic. The latter seems the more probable view. His own name was originally Uprauda. Justinianus was a Roman name which he took from his uncle Justin, who adopted him, and to whom his advancement in life was due. Of his early life we know nothing except that he went to Constantinople while still a young man, and received there an excellent education. Doubtless he knew Latin before Greek; it is alleged that he always spoke Greek with a barbarian accent. When Justin ascended the throne in 518 A.D., Justinian became at once a person of the first consequence, guiding, especially in church matters, the policy of his aged, childless, and ignorant uncle, receiving high rank and office at his hands, and soon coming to be regarded as his destined successor. On Justin's death in 527, having been a few months earlier associated with him as coëmperor, he succeeded without opposition to the throne.

His reign was filled with great events, both at home and abroad, both in peace and in war. They may be classed under four heads:—(1) his legal reforms; (2) his administration of the empire; (3) his ecclesiastical policy; and (4) his wars and foreign policy generally.

It is as a legislator and codifier of the law that Justinian's name is most familiar to the modern world. He found the law of the Roman empire in a state of great confusion. It consisted of two masses, which were usually distinguished as old law (*jus vetus*) and new law (*jus novum*).

It was clearly necessary with regard to both the older and the newer law to take some steps to collect into one or more bodies or masses so much of the law as was to be regarded as binding, reducing it within a reasonable compass, and purging away the contradictions or inconsistencies which it contained. The evil had been long felt, and reform apparently often proposed, but nothing (except by the compilation of the *Codex Theodosianus*) had been done till Justinian's time. Immediately after his accession, in 528, he appointed a commission to deal with the imperial constitutions (*jus* *novum*), this being the easier part of the problem. By this means the bulk of the statute law was immensely reduced, its obscurities and internal discrepancies in great measure removed, its provisions adapted, by the abrogation of what was obsolete, to the circumstances of Justinian's own time. This *Codex Constitutionum* was formally promulgated and enacted as one great consolidating statute in 529, all imperial ordinances not included in it being repealed at one stroke.

The success of this first experiment encouraged the emperor to attempt the more difficult enterprise of simplifying and digesting the older law contained in the treatises of the jurists. Before entering on this, however, he wisely took the preliminary step of settling the more important of the legal questions as to which the older jurists had been divided in opinion, and which had therefore remained sources of difficulty, a difficulty aggravated by the general decline, during the last two centuries, of the level of forensic and judicial learning. This was accomplished by a series of constitutions known as the "Fifty Decisions" (*Quinquaginta Decisiones*), along with which there were published other ordinances amending the law in a variety of points, in which old and new inconvenient rules had been suffered to subsist. In enacting the *Digest* as a law book, Justinian repealed all the other law contained in the treatises of the jurists (that *jus vetus* which has been already mentioned), and directed that those treatises should never be cited in future, even by way of illustration; and he of course at the same time abrogated all the older statutes, from the Twelve Tables downward, which had formed a part of the *jus vetus*. This was a necessary incident of his scheme of reform. But he went too far, and indeed attempted what was impossible, when he forbade all commentaries upon the *Digest*. He was obliged to allow a Greek translation to be made of it, but directed this translation to be exactly literal.

These two great enterprises had substantially dispatched Justinian's work; however, he, or rather Tribonian, who seems to have acted both as his adviser and as his chief executive officer in all legal affairs, conceived that a third book was needed, viz., an elementary manual for beginners which should present an outline of the law in a clear and simple form. The little work of Gaius, most of which we now possess under the title of *Commentarii Institutionum*, had served this purpose for nearly four centuries; but much of it had, owing to changes in the law, become inapplicable, so that a new manual seemed to be required. Justinian accordingly directed Tribonian, with two coadjutors, Theophilus, professor of law in the university of Constantinople, and Dorotheus, professor in the great law school at Beyrout, to prepare an elementary text-book on the lines of Gaius. This they did while the *Digest* was in progress, and produced the useful little treatise which has ever since been the book with which students commonly begin their studies of Roman law, the *Institutes of Justinian*.

From what has been already stated, the reader will perceive that Justinian did not, according to a strict use of terms, codify the Roman law. What he did do was something quite different. It was not codification, but consolidation, not remolding, but abridging. He made extracts from the existing law, preserving the old words, and merely cutting out repetitions, removing contradictions, retrenching superfluities, so as immensely to reduce the bulk of the whole. And he made not one set of such extracts, but two, one for the jurist law, the other for the statute law.

In his financial administration of the empire, Justinian is represented to us as being at once rapacious and extravagant. His unwearied activity and inordinate vanity led him to form all kinds of expensive projects, and undertake a great many costly public works, many of them, such as the erection of palaces and churches, unremunerative. The money needed for these, for his wars, and for buying off the barbarians who threatened the frontiers, had to be obtained by increasing the burdens of the people. They suffered, not only from the regular taxes, which were seldom remitted even after bad seasons, but also from monopolies; and Procopius goes so far as to allege that the emperor made a practice of further recruiting his treasury by confiscating on slight or fictitious pretexts the property of persons who had displeased Theodora or himself. Fiscal severities were no doubt one cause of the insurrections which now and then broke out, and in the gravest of which, 532 A.D., 30,000 persons are said to have perished in the capital. Financial necessities compelled retrenchment, so that a certain number of offices were suppressed altogether, much to the disgust of the office-holding class, which was numerous and wealthy, and had almost come to look on the civil service as its hereditary possession. The most remarkable instance of this policy was the discontinuance of the consulship. This great office had remained a dignity centuries after it had ceased to be a power; but it was a very costly dignity, the holder being expected to spend large sums in public displays. As these sums were provided by the state, Justinian saved something considerable by stopping the payment. He named no consul after Basilius, who was the name-giving consul of the year 541 A.D.

The department of administration in which he seems to have felt most personal interest was that of public works. He spent immense sums on buildings of all sorts, on quays and harbors, on fortifications, repairing the walls of cities and erecting castles in Thrace to check the inroads of the barbarians, on aqueducts, on monasteries, above all, upon churches. Of these works only two remain perfect, St. Sophia in Constantinople, now a mosque, and one of the architectural wonders of the world, and the church of SS. Sergius and Bacchus, now commonly called Little St. Sophia, which stands about half a mile from the great church, and is in its way a very delicate and beautiful piece of work.

As no preceding sovereign had been so much interested in church affairs, so none seems to have shown so much activity as a persecutor both of heathen and of heretics. He renewed with additional stringency the laws against both these classes. The former embraced a large part of the rural population in certain secluded districts, such as parts of Asia Minor and the Peloponnesus; and we are told that the efforts directed against them resulted in the forcible baptism of 70,000 persons in Asia Minor alone. Heathenism, however, survived; we find it in Laconia in the end of the ninth century, and in northern Syria it has lasted till our own times. There were also a good many crypto-pagans among the educated population of the capital. Procopius, for instance, if he was not actually a pagan, was certainly very little of a Christian. Inquiries made in the third year of Justinian's reign drove nearly all of these persons into an outward conformity, and their offspring seem to have become ordinary Christians. At Athens, the philosophers who taught in the schools hallowed by memories of Plato still openly professed what passed for heathenism, though it was really a body of moral doctrine, strongly tinged with mysticism, in which there was far more of Christianity and of the speculative metaphysics of the East than of the old Olympian religion. Justinian, partly from religious motives, partly because he discountenanced all rivals to the imperial university of Constantinople, closed these Athenian schools (529).

Justinian was engaged in three great foreign wars, two of them of his own seeking, the third a legacy which nearly every emperor had come into for three centuries, the secular strife of Rome and Persia.

These enterprises had begun in 533 with an attack on the Vandals, who were then reigning in Africa. Belisarius, dispatched from Constantinople with a large fleet and army, landed without opposition, and destroyed the barbarian power in two engagements. North Africa from beyond the straits of Gibraltar to the Syrtes became again a Roman province, although the Moorish tribes of the interior maintained a species of independence; and part of southern Spain was also recovered for the empire. The ease with which so important a conquest had been effected encouraged Justinian to attack the Ostrogoths of Italy, whose kingdom, though vast in extent, for it included part of southeastern Gaul, Rhætia, Dalmatia, and part of Pannonia, as well as Italy, Sicily, Sardinia, and Corsica, had been grievously weakened by the death first of the great Theodoric, and some years later of his grandson Athalaric, so that the Gothic nation was practically without a head. Justinian began the war in 535, taking as his pretext the murder of Queen Amalasontha, daughter of Theodoric, who had placed herself under his protection, and alleging that the Ostrogothic kingdom had always owned a species of allegiance to the emperor at Constantinople. There was some foundation for this claim, although of course it could not have been made effective against Theodoric, who was more powerful than his supposed suzerain. Belisarius, who had been made commander of the Italian expedition, overran Sicily, reduced southern Italy, and in 536 occupied Rome. Here he was attacked in the following year by Vitigis, who had been chosen king by the Goths, with a greatly superior force. After a siege of more than a year, the energy, skill and courage of Belisarius, and the sickness which was preying on the Goths, obliged Vitigis to retire. Belisarius pursued the dimished army northward, shut it up in Ravenna, and ultimately received the surrender of that impregnable city. Vitigis was sent prisoner to Constantinople, where Justinian treated him, as he had previously treated the captive Vandal king, with clemency. The imperial administration was established through Italy, but its rapacity soon began to excite discontent, and the kernel of the Gothic nation had not submitted. After two short and unfortunate reigns, the crown had been bestowed on Totila or Baduila, a warrior of distinguished abilities, who by degrees drove the imperial generals and governors out of Italy. Belisarius was sent against him, but with forces too small for the gravity of the situation. He moved from place to place during several years, but saw city after city captured by or open its gates to Totila, till only Ravenna, Otranto and Ancona remained. Justinian was occupied by the ecclesiastical controversy of the three chapters, and had not the money to fit out a proper army and fleet; indeed, it may be doubted whether he would ever have roused himself to the necessary exertions but for the presence at Constantinople of a knot of Roman exiles, who kept urging him to reconquer Italy, representing that with their help and the sympathy of the people it would not be a difficult enterprise. The emperor at last complied, and in 552 a powerful army was dispatched under Narses, an Armenian eunuch now advanced in life, but reputed the most skillful general of the age, as Belisarius was the hottest soldier. He marched along the coast of the Gulf of Venice, and encountered the army of Totila at Taginæ, not far from Cesena. Totila was slain, and the Gothic cause irretrievably lost. The valiant remains of the nation made another stand under Teias on the Lactarian hill in Campania; after that they disappear from history. Italy was recovered for the empire, but it was an Italy terribly impoverished and depopulated, whose possession carried little strength with it. Justinian's policy both in the Vandalic and in the Gothic war stands condemned by the result. The resources of the State, which might better have been spent in defending the northern frontier against Slavs and Huns, and the eastern frontier against Persians, were consumed in the conquest of two countries which had suffered too much to be of any substantial value, and which, separated by language as well as by intervening seas, could not be permanently retained. However, Justinian must have been almost preternaturally wise to have foreseen this: his conduct was in the circumstances only what might have been expected from an ambitious prince who perceived an opportunity of recovering territories that had formerly belonged to the empire, and over which its rights were conceived to be only suspended.

Besides these three great foreign wars, Justinian's reign was troubled by a constant succession of border inroads, especially on the northern frontier, where the various Slavonic and Hunnish tribes who were established along the lower Danube and on the north coast of the Black Sea made frequent marauding expeditions into Thrace and Macedonia, sometimes penetrating as far as the walls of Constantinople in one direction and the isthmus of Corinth in another. Immense damage was inflicted by these marauders on the subjects of the empire, who seem to have been mostly too peaceable to defend themselves, and whom the emperor could not spare troops enough to protect. Fields were laid waste, villages burnt, large numbers of people carried into captivity, and on one occasion the capital was itself in danger.

It only remains to say something regarding Justinian's personal character and capacities, with regard to which a great diversity of opinion has existed among historians. The civilians, looking on him as a patriarch of their science, have as a rule extolled his wisdom and virtues ; while ecclesiastics of the Roman Church, from Cardinal Baronius downward, have been offended by his arbitrary conduct toward the popes, and by his last lapse into heresy, and have therefore been disposed to accept the stories which ascribe to him perfidy, cruelty, rapacity, and extravagance. The truth seems to be that Justinian was not a great ruler in the higher sense of the word, that is to say, a man of large views, deep insight, a capacity for forming just such plans as the circumstances needed, and carrying them out by a skillful adaptation of means to ends. But he was a man of considerable abilities, wonderful activity of mind, and admirable industry. Even his devotion to work, which excites our admiration in the center of a luxurious court, was to a great extent unprofitable, for it was mainly given to theological controversies which neither he nor any one else could settle. Still, after making all deductions, it is plain that the man who accomplished so much, and kept the whole world so occupied, as Justinian did during the thirty-eight years of his reign, must have possessed no common abilities. He had no children by his marriage with Theodora, and did not marry after her decease. On his death, which took place November 14, 565, the crown passed to his nephew Justin II.

JUSTINIAN II., Rhinotmetus, Roman emperor of the East from 685 to 695, and from 704 to 711, succeeded his father Constantine IV., at the age of sixteen. His reign was unhappy both at home and abroad. He made a truce with the Arabs, which admitted them to the joint possession of Armenia, Iberia, and Cyprus, while by removing 10,000 Christian Maronites from their native Lebanon, he gave the Arabs a command over Asia Minor of which they took advantage in 692 by conquering all Armenia. In 688 Justinian was defeated by the Bulgarians. Meanwhile the bitter dissensions caused in the church by the emperor, his bloody persecution of the Manichæans, and the insatiable and cruel rapacity with which, through his creatures Stephanus and Theodatus, he extorted the means of gratifying his sumptuous tastes, maddened his subjects into rebellion. In 695 they rose under Leontius, and, after cutting off the emperor's nose (whence his surname), banished him to Cherson in the Crimea. Leontius, after a reign of three years, was in turn dethroned and imprisoned by Tiberius Absimarus, who next assumed the purple. Justinian meanwhile had escaped from Cherson and married Theodora, sister of Busirus, khan of the Khazars. Compelled, however, by the intrigues of Tiberius, to quit his new home, he fled to Terbelis, king of the Bulgarians. With an army of 15,000 horsemen Justinian suddenly pounced upon Constantinople, slew his rivals Leontius and Tiberius, with thousands of their partisans, and once more ascended the throne in 704. His second reign was marked by an unsuccessful war against Terbelis, by Arab victories in Asia Minor, by devastating expeditions sent against his own cities of Ravenna and Cherson, and by the same cruel rapacity toward his subjects. Conspiracies again broke out; Bardanes, surnamed Philippicus, assumed the purple; and Justinian, the last of the house of Heraclius, was assassinated in Asia Minor, December, 711.

JUTE is a vegetable fiber which, notwithstanding the fact that it has come under the notice of manufacturing communities only within comparatively recent times, has advanced in importance with so rapid strides that it now occupies among vegetable fibers a position, in the manufacturing scale, inferior only to cotton and flax. The term jute appears to have been first used by Doctor Roxburgh in 1795, when he sent to the directors of the East India Company a bale of the fiber which he described as "the jute of the natives." Importations of the substance had been made at earlier times under the name of *pát*, an East Indian native term by which the fiber continued to be spoken of in England till the early years of the nineteenth century, when it was supplanted by the name it now bears. This modern name appears to be derived from *jhot* or *jhout*, the vernacular name by which the substance is known in the Cuttack district, where the East India Company had extensive roperies at the time Doctor Roxburgh first used the term.

The fiber is obtained from two species of *Corchorus* (nat. ord. *Tiliaceæ*), *C. capsularis* and *C. olitorius*, the products of both being so essentially alike that neither in commerce nor agriculture is there any distinction made between them. These and various other species of *Corchorus* are natives of Bengal, where they have been cultivated from very remote times for economic purposes, although there is reason to believe that the cultivation did not originate in the northern parts of India. The two species cultivated for jute fiber are in all respects very similar to each other, except in their fructification and the relatively greater size attained by *C. capsularis*. The capsules or seed-pods in the case of *C. capsularis* are globular, rough, and wrinkled, while in *C. olitorius* they are slender quill-like cylinders.

Both species are cultivated in India, not only on account of their fiber, but also for the sake of their leaves, which are there extensively used as a pot-herb. In 1872, a year which showed an extraordinary development of the cultivation, there were returned 921,000 acres as under jute in Bengal, to which Pubna contributed 122,000, Dinajpur 117,000, and Rangpur 100,000 acres respectively.

Hitherto jute has not been cultivated to any considerable extent in localities other than Bengal. From remote times it has been grown in the Hankow district of China, but not largely. In the United States the cultivation of the plant has also been introduced, but it has not made much progress. Recently considerable attention has been given to the culture of the plant in Egypt, and in the Dundee trade report of March 23, 1881, there occurs the following statement:—"Some samples of jute grown in Egypt are being shown here. Reports on quality are varied, but considering it is a first attempt, on the whole satisfactory. It proves beyond a doubt that Egypt is capable of producing this material, and for the trade of the district this is a matter of great importance, as having the fiber grown near at hand will enable our manufacturers to compete more successfully in all markets with the Indian mills."

A hot moist climate with abundant rainfall and rich alluvial soil appear to be the conditions most favorable for the successful cultivation of the jute plants. The land requires to be well tilled and abundantly manured, and, the ground being so prepared, the general time of sowing the seed throughout northern and eastern Bengal extends from about the middle of March to the end of May. The seed is sown broadcast on the prepared ground, the young plants are thinned out to six inches apart, and the ground carefully weeded. The stalks are ready for cutting down between the middle of August and the middle of October. As a rule the plants are cut down close to the root with a kind of bill-hook or sickle, and the fiber is obtained best in quality when the crop is secured in the flower. It is, however, common to allow the crop to run to seed, and even to ripen seed before cutting, a practice which renders the resulting fiber hard and woody, thus intensifying one of the principal drawbacks of the jute fiber.

The fiber is separated from the stalks by the process of rotting practiced in the case of flax, hemp, etc. (See FLAX.)

The characteristic by which qualities of jute are judged are principally color, luster, softness, strength, length, firmness, uniformity, and cleanness of fiber. The best qualities of jute are of a clear white yellowish color, with a fine silky luster, soft and smooth to the touch, and fine, long, and uniform in fiber. As a general rule the root ends are harsher and more woody than the middle and upper portions, but in fine jute this distinction is not so noticeable as in less valuable qualities. In length the fiber varies from six to seven feet, but occasionally it is obtained to a length of fourteen feet, and, generally speaking, in proportion to the length of the fiber is its fineness of quality.

The importation of jute into Europe commenced about the end of the last century, but so recently as that period it was confused with hemp. During the earlier years of the present century the imports slowly increased, but the shipments were so insignificant that little or no notice was taken of them by the custom house authorities. Since that time a great revolution has taken place. From that time the growth of the trade has been upon the whole steady and continuous, and marked by extraordinary progress. Excepting a comparatively insignificant fraction, the whole of these exports of raw jute has been consigned to Great Britain, the United States being the only other country which bulks at all largely in the returns.

In their general features the spinning and weaving of jute fabrics do not differ essentially as to machinery and processes from those employed in the manufacture of hemp and heavy flax goods. Owing, however, to the woody and brittle nature of the fiber, it has to undergo a preliminary treatment peculiar to itself. The pioneers of the jute industry, who did not understand this necessity, or rather who did not know how the woody and brittle character of the fiber could be remedied, were greatly perplexed by the difficulties they had to encounter, the fiber spinning badly into a hard, rough, and hairy yarn, owing to the splitting and breaking of the fiber. This peculiarity of jute, coupled also with the fact that the machinery on which it was first spun, although quite suitable for the stronger and more elastic fibers for which it was designed, required certain modifications to suit it to the weaker jute, was the cause of many annoyances and failures in the early days of the trade. Jute has recently come into use for the manufacture of paper, and it is now grown extensively in the Southern states of the Union. The United States is rapidly extending its trade in this line.

JÜTERBOGK, JUTERBOG, or JUTERBOCK, the chief town of the circle Jüterbogk-Luckenwalde, in the government district of Potsdam and province of Brandenburg, Prussia, is situated on the Nuthe, thirty-nine miles southwest of Berlin, with which it is connected by rail. Population (1901), about 8,000.

JUVENAL (DECIMUS JUNIUS JUVENALIS) has been more read and admired in modern times than any other Latin poet, with the exception of Virgil, Horace, and perhaps Ovid. He closes the roll of the great writers of Rome, and is the last vital representative of her national spirit and genius. He is the most effective satirist of Rome, not because he was the greatest writer who made satire his theme, but because the age in which he lived supplied the largest material for purely satiric representation, and because his eye was fixed on the more somber aspects of his time to the exclusion of those happier or more genial aspects which are reflected in the pages of Statius, Martial, and Pliny. The first impression produced by the satire of Juvenal is more powerful than that produced by the satire of Horace, as the impression produced by the tragical and sensational incidents of life is greater than that produced by its ordinary course and its lighter humors.

A brief account of Juvenal's life, varying considerably in some of its details, is prefixed to the different MSS. of his works. But the original on which these various versions of life are founded cannot be traced to Suetonius or to any competent authority, and some of the statements contained in it are intrinsically improbable. According to the form prefixed to the most valuable of the MSS., "Juvenal was the son or ward of a wealthy freedman; he practiced declamation till middle age, not as a professional teacher, but as an amateur, and made his first essay in satire by writing the lines on Paris, the actor and favorite of Domitian, now found in the seventh satire, (line 90 *sq.*) Encouraged by their success, he devoted himself diligently to this kind of composition, but refrained for a long time from either publicly reciting or publishing his verses. When at last he did come before the public, his recitations were attended by great crowds and received with the utmost favor. But the lines originally written on Paris, having been inserted in one of his new satires, excited the jealous anger of an actor of the time, who was a favorite of the emperor, and procured the poet's banishment under the form of a military appointment to the extremity of Egypt. Being then eighty years of age, he died shortly afterward of grief and vexation." In one account the time of his banishment is said to have been the last years of Domitian; in another he is said to have been appointed to a command against the Scots by Trajan, in another to have died in exile in the reign of Antoninus Pius, and in another to have died of a broken heart on his return to Rome, because he found his friend Martial was no longer there. One account even makes Claudius the author of his banishment. In several Aquinum is mentioned as his birthplace, and in one he is said to have been born in the time of Claudius.

JUXON, WILLIAM, archbishop of Canterbury, was born at Chichester, England, in the year 1582, and died in 1663.

K.

K. The letter K has remained with singularly little change in form even from the Phœnician alphabet down to the present time. It represents the guttural momentary sound produced by raising the back of the tongue to the back of the palate; it is surd, corresponding to G, which is sonant; and it has this value and no other in all modern alphabets in which it is found. In many alphabets, however, it is supplanted wholly or to a great extent by the symbol C. The reason of this has been already explained under the letters C and G. The substitution of C for K took place in Italy—the original character surviving only in a few well-understood abbreviations—and in consequence of this those alphabets which have been derived from Italy naturally have the C; while those derived directly from the Greek, *e.g.*, the Gothic, which came through Ulfilas, and the different alphabets which trace back to Cyril (see ALPHABET), have only the K.

KAABA, KA'BA, or KAABEH, the sacred shrine of Mahometanism, containing the "black stone," in the middle of the great mosque at Mecca. (See **MECCA,** page 4140).

KAADEN, chief town of a department in the circle of Eger, Bohemia, is situated on the Eger, about sixty miles northwest of Prague. Population about 6,000.

KABBALAH is now used as the technical name for the system of theosophy which began to be developed among the Jews in the tenth century, and which has also played an important part in the Christian church since the Middle Ages. The term primarily denotes "reception," and then "doctrines received by tradition." In the older Jewish literature the name is applied to the whole body of received religious doctrine, with the exception of the Pentateuch, thus including the Prophets and Hagiographa, as well as the oral traditions ultimately embodied in the Mishnah. It is only since the eleventh or twelfth century that Kabbalah has become the exclusive appellation for the renowned system of theosophy which claims to have been transmitted uninterruptedly by the mouths of the patriarchs and prophets ever since the creation of the first man.

KABUL. See CABUL.

KABYLES, or more correctly KABÁIL, a number of tribes in the Algerian region of northern Africa, of special interest to the politician from the peculiarity of their institutions and from the part they will probably play in the development of the French colony, and to the ethnologist as the best known branch of the great Berber race. In 1901 it was estimated that they amounted to 3,200,000. The country which they inhabit is usually regarded as consisting of two divisions —Great Kabylia and Lesser Kabylia—the former being also known as the Kabylia of the Jurjura (also called Adrar Budfel, "Mountain of Snow"). It is admitted on all hands that the Berbers form the main aboriginal element in the population of northern Africa, that at one time or other they have occupied the whole tract of country from Egypt in the east to the Canary Islands in the west, and that they are still represented not only by the Tuáreg (Amashir, etc.), who retain their native speech, but by many tribes that have become altogether Arab in language. The Kabyles are a Berber stock, and more particularly correspond to that part of the race which was known to the Romans as Numidians. Physically they do not present any very prominent contrast to the Arab of Algeria. Both Kabyle and Arab are white at birth, but rapidly grow brown through exposure to air and sunshine. Both have in general brown eyes and wavy hair of coarse quality, varying from dark brown to jet black. In stature there is perhaps a little difference in favor of the Kabyle, and he appears also to have a stouter trunk and bulkier muscles. Among the Kabyles, it is worthy of particular notice, there exists a varying proportion of individuals with fair skins, ruddy complexions, and blue or gray eyes. As to the ethnic origin of this peculiar element many conjectures have been hazarded—one theorist seeing in them the Vandals, another the Gallic mercenaries of Rome, another an aboriginal fair-skinned race, another the dolmen-building people from Europe. In the whole domain of life and character the contrasts between Arab and Kabyle are of the most radical and striking kind. The Kabyle lives in a house of stone or clay, forming part of a fixed village or hamlet; the Arab's tent is moved from place to place. The Kabyle enjoys the individual proprietorship of his garden and his orchards; with the Arab the ownership of the soil is an attribute of the tribe. While cereals alone are cultivated by the Arab, the Kabyle has his fig trees, olives, and vines, vegetables and tobacco. Active, energetic, and enterprising, the Kabyle is to be found far from home—as a soldier in the French army, as a workman in the towns, as a field laborer, or as a pedler or a trader earning by steady effort the means of purchasing his bit of ground in his native village. Nor, however insignificant they may appear when measured by a high European standard, are the native industries to be despised. Not only do they comprise the making of lime, tiles, woodwork for the houses, domestic utensils, and agricultural implements, but also the weaving and dyeing of several kinds of cloth, the tanning and dressing of leather, and the manufacture of oil and soap. Without the assistance of the wheel, the women turn out a variety of earthenware articles; before it became a sort of proscribed industry the production of gunpowder was regularly carried on; the native jewelers make excellent ornaments in silver, coral, and enamel; in some places wood carving has been brought to considerable perfection; and native artists know how to engrave on metal both by etching and the burin. Like the Arabs of Algeria, the Kabyles are Mahometans of the Sunnite branch and the Malekite rite, looking to Morocco as the nearer center of their religion; but, whereas the Arabs are fatalistic and superstitious, the Kabyles show a more independent and rationalistic turn of mind. In spite of the Koran and its administrators the Kabyles are essentially democratic. The political unit is the village or commune; so many villages constitute a fraction, so many fractions a tribe; and the tribes again are combined into the Kabaïla or confederation. The governing authority in the commune is the Jemá'a or general gathering of the citizens—every man old enough to keep the fast of the Ramadhan having a right to take part in its proceedings. It chief executive officer, the *amin*, is chosen by the good will of his fellows, receives no remuneration, and withdraws from his functions as soon as he loses the confidence of the electorate. Some of the Kabyles retain their vernacular speech, while others have more or less completely adopted Arabic. The best known dialect is that of the Igaouaouen, or Zouaoua, who, at least from the time of Ibn Khaldoun, have been settled on the northern side of the Jurjura. Unlike their southern brethren, the Kabyles have no alphabet, and their literature is still in the stage of oral transmission for the most part by professional reciters.

KADOM, a town of Russia, in the Temnikoff district of the Tamboff government, 169 miles north-northeast from Tamboff, near the Moksha, a navigable subtributary of the Volga. Population 8,000.

KÁDÚR, or CADOOR, a district of Mysore state, southern India. The larger portion of the district consists of the Malnád or hill country, which contains some of the wildest mountain scenery in southern India. The western frontier is formed by the chain of the Ghâts. The chief natural wealth of Kádur is in its forests, which contain inexhaustible supplies of the finest timber, especially teak, and also furnish shelter for the coffee plantations. Iron is found and smelted at the foot of the hills, and corundum exists in certain localities. Wild beasts and game are numerous, and fish are abundant.

The census of 1891 returned the population of the district at 332,381 (Hindus, 318,480; Mahometans, 12,017; Jains, 1,316; Christians, 568).

KAEMPFER, ENGELBRECHT, traveler and physician, celebrated by his *History of Japan*, was born at Lemgo in Lippe-Detmold, Westphalia in 1651 and died in 1716.

KAFFA, a town in the Crimea. See THEODOSIA.

KAFFA, or GOMARA, a little-known region to the south of Abyssinia in Africa, forming a cool elevated tract between the basins of the Sobat on the west and the Juba on the east. Some of its mountain summits, among which is Mount Mata Gera, are believed to be over 12,000 feet high. Kaffa is held to be the native home of the coffee-plant, which grows in wild profusion on the mountain slopes. The chief town in Bonga, described as one of the largest towns in Ethiopia.

KAFFRARIA, KAFFRES. The name Kaffraria or Kaffreland properly means the country of the Kaffres, and in this sense would embrace the whole region extending from the river Keiskamma to Delagoa Bay, including at least British Kaffraria and Kaffraria Proper, Natal, Zululand, the Transvaal, and the Orange River Free State. The term, however, has usually been confined to the districts popularly known as British Kaffraria and Kaffraria Proper. Neither term is now used officially. British Kaffraria was incorporated with Cape Colony in 1866, and now forms the two official districts of King William's Town and East London; Kaffraria Proper is now known officially as the Transkeian Territories, or simply the Transkei.

The physical characteristics of the two Kaffrarias bear a general resemblance to those of the Cape Colony, of which they are the northeast continuation. The country generally rises from the sea-level in a series of terraces to the lofty mountains forming the boundary. British Kaffraria culminates in the Amatola mountains, rising in one part to upward of 6,000 feet. The features of Kaffraria Proper are much more varied, and exhibit some of the most picturesque scenery in South Africa. The rugged range of the Drakenberg forms its northwest boundary, rising at its northeastern point to a height of 9,657 feet. Between that range and the coast-lands are many subsidiary ranges with fertile valleys through which the great rivers make their way to the Indian Ocean. The coast region is more broken than is the case farther south. The prevalent rock along the coast of Kaffraria is the Old Sandstone, non-fossilliferous rock, quartzite, intersected occasionally with veins of white quartz rock, and often capped with a dense mass of conglomerate; while the interior mountains are classed by Mr. Dunn as the Stormberg coal-bearing fossilliferous beds of the Triassic period. Kaffraria is watered by hundreds of rivers, most of them rising at no great distance from the coast, but several of them of large dimensions.

Kaffraria forms one of the most naturally fertile regions in South Africa. In British Kaffraria most of the cereals grow, and in the cloofs, and scattered over the country, are forests and clumps of valuable timber. The Transkei shows even greater possibilities of culture. The mountain gorges abound in fine trees; thick forests and bush cover the banks of the rivers; grass grows luxuriantly in the lower regions; and the lowlands and valleys are favorable to almost any kind of fruit, field, and garden cultivation. In the occupied district cattle and sheep are numerous; lions are still found in the interior, and a fair amount of the game characteristic of the inland districts belonging to the Cape. The climate generally resembles that of the eastern province of Cape Colony, but with features more approaching to those of the tropics.

British Kaffraria, on its incorporation with Cape Colony, was divided into King William's Town and East London, each with a capital of the same name, and forming the two most easterly divisions of the colony. King William's Town has an area of 1,781 square miles, and a total population of 106,640, of whom 9,012 are white; the population of the capital is 5,169. The area of East London province is 1,225 square miles, and the population 15,514, of whom 3,773 are white. Its capital, East London at the mouth of the Buffalo river, is the port for British Kaffraria. The anchorage used to be exposed, but extensive harbor works are in operation.

Kaffraria Proper or the Transkeian Territories consist of the territories of various native tribes, most of which have been annexed (1875-80) to the Cape Colony, and are under the jurisdiction of magistrates. The area of Kaffraria Proper is about 18,000 square miles—its extreme length being about 230 miles, and its breadth from the sea to the mountains bounding it on the northwest averaging about 120 miles. On the southeast it is washed by the Indian Ocean; the Drakenberg and Stormberg ranges bound it on the northwest; in the west and southwest are the Indwe and Kei rivers, and on the east and northeast the Umzimkulu and Untamvuna. It is surrounded by Cape Colony, Basutoland, and Natal. The area and population of the various districts can only be given approximately; the following is an official estimate of the present population:—

Fingoland	45,000
Idutwya Reserve	18,000
Gcalekaland (Kreli's country)	60,000
Bomvaniland	20,000
Tambookieland	70,000
Griqualand East	150,000
Pondoland	230,000
	593,000

Fingoland, to which (with the Idutwya Reserve and Gcalekaland) the name Tanskeian Territory, or the Transkei, is often confined, is about 40 miles square, and is the most advanced of the districts; it is suited both for pasture and for cultivation.

The Kaffres, or Kafirs, a large South African race, form ethnically a well-marked variety of the Negro type, and linguistically a distinct branch of the Bantu family. There are no general or collective national names, and the various tribal divisions are mostly designated by those of distinguished historical or legendary chiefs, founders of dynasties or hereditary chieftaincies. The name Káfir (a form which in popular usage designates the African race less frequently than the inhabitants of Kafiristan in Persia) is that applied by Mahometans to all who reject the faith of Islám. It was thus current along the east coast of Africa at the arrival of the Portuguese, and passed from them to the Dutch and English, and recently even to the natives themselves under the form of *Kafula*.

The origin of the Zulu-Kaffre race has given rise to much controversy. It is obvious that they are not the aborigines of their present domain, whence in comparatively recent times they have displaced the Hottentots and Bosjesmans of fundamentally distinct stock. On the other hand they are closely allied in speech and physique to the surrounding Basutos, Bechuanas, Matebeles, and other members of the great South African Negroid family. Hence no far-fetched theories are needed to account for their appearance in the southeast corner of the continent, where their presence is sufficiently explained by the gradual onward movement of the populations pressing southward on the Hottentot and Bosjesman domain. The specific differences in speech and appearance by which they are distinguished from the other branches of the family must in the same way be explained by the altered climatic and other outward conditions of their new habitat. Hence it is that the further they have penetrated southward the further have they become differentiated from the pure Negro type, from which attempts have even been made to separate them altogether.

The symmetrical and manly figures of the more warlike tribes are usually arrayed in leopard or ox skins, of late years often replaced by European blankets, with feather head-dresses, coral and metal ornaments, bead armlets, and necklaces. The Makuas and a few others practice tattooing, and the Ama-Xosas are fond of painting or smearing their bodies with red ochre. Their arms consist chiefly of ox-hide shields four to six feet long, the kerri or club, and the assegai, of which there are two kinds, one long with nine-inch narrow blade, for throwing, the other short with broad blade twelve to eighteen inches long, for stabbing. The dwellings, like those of the Hottentots, are simple conical huts grouped in kraals or villages, mostly of a temporary character. For all the Kaffres are still semi-nomadic, and easily break up their homes in search of fresh pastures. But, although cattle form their chief wealth, and hunting and stock-breeding their main pursuits, many have in recent times turned to husbandry. The Zulus raise regular crops of "mealies" (maize), and the Ama-Mpondas cultivate a species of millet, tobacco, watermelons, yams, and other vegetables. Milk, millet, and maize form the staples of food, and meat is seldom eaten except in time of war. Among some tribes the order to kill and eat their cattle is in fact equivalent to an order to prepare for some warlike undertaking.

Mentally and morally the Kaffres are on the whole superior to the average Negro. In all their social and political relations they display great tact and intelligence; they are remarkably brave, warlike, and hospitable, and were naturally honest and truthful until through contact with the whites they became suspicious, revengeful, and thievish, besides acquiring most European vices. Of religion, as ordinarily understood, they have very little, and have certainly never developed any mythologies or dogmatic systems.

KÂFIRISTÂN. This Persian term, signifying "the country of Kâfirs," or unbelievers (in Islâm), has within the last hundred years become established in geography as the name of a mountain tract on the north of Afghanistan, occupied by tribes which have resisted conversion to the faith which prevails on every side. This faith has no doubt continually gained upon these tribes more or less, and with this encroachment the limits of the Kafir country have shrunk; but the encroachment does not appear to have been large since the name became recognized in geography. The country has never been entered, and even the bordering Mahometan tracts have only here and there been touched, by any European, so that we know hardly anything of its internal geography, and not even the external geography with any precision. The northern boundary may be taken as that unvisited part of the watershed of Hindû Kûsh which lies between the Dorah Pass and the Khâwak Pass leading into the Andarâb valley of the province of Kunduz (see AFGHAN TURKESTAN). On the east it is limited by Chitrâl or Kâshkâr; on the south and west it is more difficult to define.

KAHLÚR, also called BILÁSPUR, one of the petty hill states in the Punjab, India. The area is 448 square miles, and the estimated population 60,000.

K'AI-FUNG FOO is the capital of the province of Honan in China, and is one of the most ancient cities in the empire. A city on the present site was first built by Duke Chwang (774–700 B.C.) to mark off (*k'ai*) the boundary of his fief (*fung*); hence its name. The city is situated at the point where the last spur of the Kwan-lun mountain system melts away in the eastern plain, and a few miles south of the Yellow river. Its position, therefore, lays it open to the destructive influences of the Hwang-ho. In 1642 it was totally destroyed by a flood caused by the dykes of that river bursting, and on several prior and subsequent occasions it has suffered injury from the same cause. The city is large and imposing-looking, with broad streets and handsome edifices, the most noticeable of which are a twelve-storied pagoda 600 feet high, and a watch-tower from which, at a height of 200 feet, the inhabitants are able to observe the approach of the yellow waters of the river in times of flood. The city wall forms a substantial protection, and is pierced by five gates. The whole neighborhood, which is the site of one of the earliest settlements of the Chinese in China, is full of historical associations, and it was in this city that the Jews who entered China in the reign of Minge-te (58–75 A.D.) first established a colony. For many centuries these people held themselves aloof from the natives, and practiced the rites of their religion in a temple built and supported by themselves. Of late years, however, they have fallen upon evil times, and in 1851, out of the seventy families which constituted the original colony, only seven remained. Of the population, which is probably not far short of 100,000, it is estimated that two-thirds of the tradesmen, tavern-keepers, educated classes, and attendants at the government offices are Mahometans.

KAIRA, a British district in the province of Guzerat, Bombay, India, with an area of 1,561 square miles. Except a small corner of hilly ground near its northern boundary, and in the southeast and south where the land along the Mahi is furrowed into deep ravines, Kaira district forms one unbroken plain, sloping gently toward the southwest. The north and northeast portions are dotted with patches of rich rice land, broken by untilled tracts of low brushwood. The center of the district is very fertile and highly cultivated; the luxuriant fields are surrounded by high growing hedges, and the whole country is clothed with clusters of large, shapely trees. The population is estimated at 800,000.

Kaira, chief town and headquarters of the above district, situated five miles southwest of Mehamadábád railway station, is a very ancient city, having a legendary connection with the *Mahábhárata*, and is proved by the evidence of copperplate grants to have been known as early as the fifth century. Population, 13,000.

KAIRWAN, Kirwan, Kerouan (properly Kairawán), the Mecca of northern Africa, is a city of the regency of Tunis, thirty miles inland from Susa, and about eighty miles due south from the capital. It is built in an open plain a little to the west of a stream which flows south to the Sidi el Heni lake. Of the luxuriant gardens and olive groves which form so prominent a feature in the early Arabic accounts of the place hardly a remnant has been left. The total circuit of the walls, according to Edward Rae, is about 3,500 yards; and the population is variously estimated from 10.000 to 15,000.

KAISARIEH. See Cæsarea.

KAISERSLAUTERN, the chief town of a circle in the government district of Rheinpfalz, Bavaria, is situated on the Lauter, in the hilly district of Westrich, about forty miles west of Mannheim, and is one of the most important industrial towns of the Palatinate. Population, 3,300.

KAISERSWERTH, an ancient town in the circle and government district of Düsseldorf, Prussia, is situated on the right bank of the Rhine, six miles below Düsseldorf. Population, 2,500.

KAITHAL, or Kythal, an ancient town in Karnál district, Punjab, India. Population about 15,000.

KAKAPO, the Maori name, signifying "Night-Parrot," and frequently adopted by English writers, of a bird, commonly called by British colonists in New Zealand the "Ground-Parrot" or "Owl-Parrot."

KÁLABÁGH, or Kulabagh, a town in Bannu district, Punjab, India, picturesquely situated at the foot of the Salt Range, on the right bank of the Indus, where the river debouches from the hills, 105 miles below Attock. Population, 7,000.

KALAMATA, chief town of the modern Greek nomarchy of Messenia in the Morea, is situated on the left bank of the Nedon, about a mile from the sea. Population, 6,500.

KALAMAZOO, the county seat of Kalamazoo county, Mich., forty miles east of Lake Michigan, and equidistant from Chicago and Detroit, at the intersection of four railways, in the center of one of the finest agricultural districts in the country. The public institutions include Kalamazoo College, the Michigan Female Seminary, and an asylum for the insane. About one-third of all the windmills in the United States are made here. Agricultural implements, carriages, steel springs, paper, and milling machinery are among the chief manufactures; and there are also extensive planing mills and flour mills. Population (1900), 24,404.

KALATCH, a town of Russia, in the country of the Don Cossacks, on the left bank of the Don above the confluence of the Karpovka. Population, 12,000.

KALBE, or Calbe, an der Saale, chief town of a circle in the government district of Madgeburg, Prussia, is situated on the Saale, three miles from the Saale (Grizehne) station, on the Leipsic and Madgeburg Railway. Population, 11,500.

KALEIDOSCOPE. This, as the name implies, is an instrument by means of which beautiful forms may be seen. It was invented by Sir David Brewster about 1815—the idea of the instrument having occurred to him some time before while he was engaged with experiments on the polarization of light by reflection. When it first appeared it attracted almost universal attention. This arose from the extreme beauty of the forms which it presented, their endless variety and perfect symmetry, as well as the readiness with which one beautiful form could be converted into another. The construction of the instrument was so simple, too, that almost any one could make it; and, in consequence, the patent originally taken out by Brewster was persistently evaded; kaleidoscopes were made by the hundred, and sold in almost every toy shop. Large cargoes of them were sent abroad; and it is stated that no fewer than two hundred thousand were sold in London and Paris in the space of three months. Besides being of especial service in the art of the designer, the kaleidoscope constitutes a very useful piece of philosophical apparatus, as it illustrates, in a very beautiful way, the optical problem of the multiplication of images produced by reflection when the object is placed between plane mirrors inclined to each other at a definite angle.

The simple kaleidoscope consists essentially of several plane mirrors inclined to each other at an angle which is an even submultiple of 360°. A very common angle in practice is 60°. The mirrors are usually made of strips of thin flat glass—the length of each being from six to twelve inches, and the greatest breadth from one to three inches. The mirrors are first fixed, in any convenient manner, at the proper angle, and then inserted into a cylindrical tube of brass or paper. At the one end of the tube is a small eye-hole, while the other end is closed by what is called the "object box." This consists of a shallow cylindrical box, which fits on to the end of the tube, and contains the objects from whose reflection the pattern is produced. These objects may consist of petals of differently colored flowers, scraps of differently colored paper, or, still better, pieces of colored glass. Very often the objects consist of small glass tubes filled with differently colored liquids and then hermetically sealed. These produce a very fine effect. The objects are placed in the box between two circles of thin glass which fit into the box, the one of which is transparent and the other obscured by grinding.

KALGAN, or Chang-kea-Kow, a large city of China, in the province of Chih-li, with a population estimated at from 70,000 to 100,000. It lies in the line of the Great Wall, 137 miles northwest of Peking, commanding one of the most important passes between China and Mongolia and the main road of the overland route between China and Russia.

KÁLIDÁSA is the most illustrious name among the writers of the second epoch of Sanskrit literature, which, as contrasted with the age of the Vedic hymns, may be characterized as the period of artificial poetry. Owing to the utter absence of the historical sense in the Hindu race, it is impossible to fix with chronological exactness the lifetime of either Kálidása or any other Sanskrit author. Native tradition places him in the first century B.C.; but the evidence on which this belief rests has been shown to be wholly worthless.

KALINGA, or Calinga, one of the nine kingdoms of southern India in ancient times. Its exact limits varied, but included the eastern Madras coast, from Pulicat to Chicacole, running inland from the Bay of Bengal to the Eastern Gháts.

KALINGAPATAM, or Calingapatam, a town and port in Ganjám district, Madras, situated at the mouth of the Vamsadhára river. Population about 5,000.

KALISH, the chief town of a government of the same name in Russian Poland, is situated 135 miles due west of Warsaw on the banks of the Prosna, which there forms the boundary of Prussia. Population about 21,000.

KALITVENSKAYA, a stanitsa or camp-village in the country of the Don Cossacks, on the left bank of the Donetz, eighty-one miles east of Novotcherkassk. Population, 15,000.

KÁLN , or CULNA, a town in Bardwán district, Bengal, India, situated on the right bank of the Bhágirathí river. Population about 27,000.

KALOCSA, a town of Hungary, and capital of the former county of Solt (now included in the county of Pest-Pilis-Solt-Kis-Kun), is situated in a marshy but highly productive district, three miles distant from a steam-packet station on the left bank of the Danube, and about sixty-nine miles south of Budapest. Population about 16,000.

KÂLPI, or CULPEE, a town in Jaláun district, Northwestern Provinces, India, situated on the right bank of the Jumna.

KALUGA, a central government of European Russia, surrounded by those of Moscow, Smolensk, Orel (Orloff), and Tula. The area is estimated at 25,594 square miles, or according to the maps of the Kaluga surveying office. 27,407. The government is divided into eleven districts (*uyezd*):—Kaluga, Mosalsk, Meshtchovsk, Likhvin, Kozelsk, Zhizdra, Peremuishl, Meduin, Borovsk, Maloyaroslavets, and Tarusa. The following are the towns of more than 5,000 inhabitants, according to the return for 1887:—Kaluga, 38,600; Zhizdra, 11,700; Borovsk, 9,500; Meduin, 7,800; Kozelsk, 7,350; Sukhinitchi, 6,050; Meshtchovsk, 5,450; Maloyaroslavets, 5,150. The government had a population of 1,185,726 in 1898.

KALUGA, the chief town of the above government, is situated 475 feet above the sea-level on the left bank of the Oka, at the confluence of the Yatchenka, 114 miles southwest of Moscow. Population, (1898), 49,728.

KALVARIYA, (*i.e.*, Calvary), a district town in the government of Suvalki in Russian Poland, on the right bank of the Shelupa, forty miles southwest of Kovno. Population, 12,000.

KALW, or CALW, chief town of a circle in the government district of Schwarzwald, Würtemberg, is situated on the Nagold, about thirty-four miles southwest of Stuttgart by rail. Population, 5,000.

KÁMALÁ, a red powder used in medicine as an anthelmintic. It is obtained from *Mallotus Philippinensis*, Müll., a large shrub or small tree from twenty to forty-five feet in height, widely distributed in Asia, from southern Arabia in the west to North Australia and the Philippines in the east. The fruit of this species, as of many other euphorbiaceous plants, is covered with stellate hairs, among which are intermixed ruby-colored glands. These are found also on other parts of the plant, especially among the down with which the under surface of the leaf is covered. Kámalá is collected in many parts of India, and forms one of the lesser products of the government forests in the Madras presidency at Naini Tal, where the *Mallotus* is found growing in immense quantities at the foot of the hills.

Numbers of people, chiefly women and children, are engaged in collecting the powder for exportation. A quantity of the berries is thrown into a large basket, and rubbed with the hand until the powder is removed and falls through the basket, as through a sieve, on a cloth spread below it to receive it.

KAMCHATKA, or KAMTCHATKA, a peninsular portion of eastern Siberia, Russia, stretching south between the Sea of Okhotsk on the west and Behring's Sea on the east, and finding its physical continuation first in the Kurile Islands (of which Shunshu is only seven miles distant from the terminal Cape Lopatka) and then in the larger islands of the empire of Japan. The area is estimated at 237,266 square miles. The range of mountains which forms the backbone of the peninsula opens up toward the middle into two distinct branches, and gives the whole the general outline of an oval leaf. The western branch is the higher of the two. Southward from 57° N. latitude there are no less than twelve active and twenty extinct craters—all, however, except five on the eastern side of the peninsula. Native copper, magnetic iron, lignite, amber, mica and sulphur are the chief minerals. Of the rivers the largest bears the same name as the peninsula; rising in the highest part of the central range, it flows north for about 310 miles, and falls into the Behring Sea. The valley of the Kamchatka forms the most fertile and most populous portion of the peninsula. Vegetation, especially on soils of volcanic origin, is remakably luxuriant; the grass grows nearly five feet high, and may be cut three times. In the woods berries, mushrooms, and the Martagon lily abound, the bulbs of the last also furnishing food to the natives. Besides the Kamchadales proper there are Koryak and Lamut tribes within the limits of the peninsula. By themselves the Kamchadales are called Itelm—the name by which they are usually known being a corruption of Konchal, their Koryak appellation. There are not in all more than 2,000 Kamchadales, and the process of Russification is going on rapidly. They are a strong hardy people, inured to the severities of the climate, capable of any amount of toil in the way of walking. To their women they are affectionate and even submissive. In winter they live in pits covered in with earth and turf, the interior being reached by means of a ladder. In the summer they occupy slight wooden sheds (*bologans*) raised on high props or stilts. The skill they display in the training of their sledge dogs is not surpassed by any other people who practice the same art. With their sledges (narts)—which measure from five to ten feet in length—they travel four to eight miles an hour. The Kamchadale language cannot be assigned to any known group; its vocabulary is extremely poor. The purity of the tongue is best preserved by the people of the Penzhinsk district on the west coast; many of the inhabitants of the Kamchatka valley speak a broken Russian. Mr. Kennan compares the sound of the language to that of water running out of a narrow-mouthed jug. The total population of the peninsula was 7,331 in 1853, and 6,000 in 1900.

KAMENETS, usually distinguished as Podolian Kamenets, to distinguish it from Lithuanian Kamenets in Grodno, is the chief town of the government of Podolia, Russia. It is situated 982 miles south of St. Petersburg, and occupies a high and rocky peninsula formed by the river Smotritch, a left-hand tributary of the Dniester. Population (1898), 34,483.

KAMENZ, chief town of a department in the circle of Bautzen, Saxony, is situated on the Black Elster, about twenty-one miles northeast of Dresden. Population, 7,500.

KAMES, HENRY H[illegible]. LORD, a philosopher and Scotch judge, was descended from an old Scotch family, and was the son of George Home of Kames, in the county of Berwick, where he was born in 1696. He was called to the bar in 1723, and employed his leisure in the compilation of a volume which he published in 1728 under the title *Remarkable Decisions in the Court of Session from 1716 to 1728.* This work having attracted attention to his abilities, his power of ingenious reasoning and mastery of law gradually gained him a leading position at the bar. In 1752 he was appointed a judge in the court of session under the title of Lord Kames, and in 1763 he was made one of the lords of justiciary. Through his wife, Agatha Drummond, whom he married in 1741, he in 1761 succeeded to the estate of Blair Drummond, Perthshire, where he put into practice a remarkably bold scheme of agricultural improvement, the removal of a stratum of peat on 1,500 acres of land by floating it into the river Forth. He died at Edinburgh, December 27, 1782.

KAMMIN, or CAMMIN, the chief town of a circle in the government district of Stettin, Prussia, is situated two and one-half miles from the Baltic coast, on the Kamminsche Bodden, a lake connected with the sea by the Dievenow. Population about 6,500.

KAMPEN, a town of Holland, in the province of Overyssel, stretches for nearly a mile along the left bank of the Yssel, about three and three-quarter miles above the mouth of the river. It is connected by railway with Zwolle. The town is traversed in its whole length by a canal, and the old walls have been transformed into promenades and drives. Three of the town gates are good examples of the style of such architecture in the sixteenth and seventeenth centuries. The inhabitants number 18,000.

KAMPTULICON. See FLOOR CLOTH.

KÁMRÚP, a district of Assam, India, extending along both banks of the Brahmaputra.

The general physical characteristics of Kámrúp are those common to the whole valley of Assam. In the immediate neighborhood of the Brahmaputra the land is low, and exposed to annual inundation. In this marshy tract reeds and canes flourish luxuriantly, and the only cultivation is that of rice. At a comparatively short distance from the river banks, the ground begins to rise in undulating knolls toward the mountains of Bhután on the north, and toward Khási territory on the south. The hills south of the Brahmaputra in some parts reach the height of 800 feet. It is on the slopes of these hills, amid the primeval jungle, that European planters have set out their trim tea-gardens. The general scenery of Kámrúp is thus agreeably diversified; and the villages are described as very picturesque.

The census of 1891 returned a population of 561,781 (292,688 males and 268,993 females), spread over an area of 3,631 square miles. Hindus numbered 514,024; Mahometans, 45,823; Buddhists, 182; Christians, 204, of whom 120 are natives; and "others," 448.

KAMTHÍ, or KAMPTEE, a large town and cantonment in Nágpur district, Central Provinces, India. Population, 48,831.

KAMUISHIN, or KAMYSHIN, a town of Russia, in the Saratoff government, on the right bank of the Volga, 120 miles south-southwest of Saratoff, on the highway to Astrakhan. Population, 18,000.

KANANÚR, or CANNANORE, a town, seaport, and cantonment in Malabar district, Madras, India, with a population of 10,265.

KÁNARA, or CANARA, NORTH, the most southerly of the coast districts of Bombay, India, with an area of 4,235 square miles. The chief town is Kárwár.

KÁNARA, or CANARA, SOUTH, a district on the western coast of the Madras presidency, India, with an area of 3,902 square miles. The chief town is Mangalore. The census of 1891 returned a population of 919,513 (235 to the square mile), of whom 787,183 were Hindus, 82,803 Mahometans, 49,517 Christians, and 10 "others." The only towns with a population exceeding 2,000, are Mulki, Udipi, Kárikal, Bantwal, and Mangalore.

KANAUJ, an ancient city in Farrukhabad district, Northwestern Provinces, India, with a population of 17,093, viz., 10,864 Hindus and 6,229 Mahometans.

KANDAHAR, the largest city in Afghanistan, is situated in 31° 37′ N. latitude and 65° 43′ E. longitude, at a height of 3,400 feet above the sea. It is 370 miles distant from Herat on the northwest, by Girishk and Farrah—Girishk being 75 miles, and Farrah 225 miles from Kandahar. From Cabul, on the northeast, it is distant 315 miles, by Khelat-i-Ghilzai and Ghazni—Khelat-i-Ghilzai being 85 miles, and Ghazni 225 miles from Kandahar. To the Pishin valley the distance is about 110 miles, and from Pishin to India the three principal routes measure approximately as follows: By the Zhób valley to Dera Ismail Khan, 300 miles; by the Bóri valley to Dera Ghazi Khan, 275 miles; by Quetta and the Bolán to Dadur, 125 miles; and by Chappar and Nari (the proposed railway route) to Sibi, 120 miles. Sibi is connected by rail with the rest of India. Immediately around the city is a plain, highly cultivated and well populated to the south and west; but on the northwest this plain is barren, and is bounded by a double line of rough and precipitous hills, rising to about 1,000 feet above its general level, and breaking its dull monotony with irregular lines of scarped precipices, crowned with fantastic pinnacles and peaks. To the northwest these hills form the watershed between the valleys of the Argandab and the Tarnak, until they are lost in the mountain masses of the Hazarajat, a wild region inhabited by tribes of Tartar origin, which effectually shuts off Kandahar from communication with the north. On the southwest they lose themselves in the sandy desert of Registan, which wraps itself around the plain of Kandahar, and forms another impassable barrier.

But there is a break in these hills—a gate, as it were, to the great high road between Herat and India; and it is this gate which the fortress of Kandahar so effectually guards, and to which it owes its strategic importance. Other routes there are, open to trade, between Herat and northern India, either following the banks of the Hari Rud, or, more circuitously, through the valley of the Helmand to Cabul; or the line of hills between the Argandab and the Tarnak may be crossed close to Khelat-i-Ghilzai; but of the two former it may be said that they are not ways open to the passage of Afghan armies owing to the hereditary bitterness of hostility existing between the Eimák and Hazára tribes and the Afghans generally, while the latter is not beyond striking distance from Kandahar. The one great high road from Herat and the Persian frontier to India is that which passes by Farrah and crosses the Helmand at Girishk. Between Kandahar and India new and feasible means of communication are being discovered with every geographical search into the intermediate country. To the northwest, and parallel to the long ridges of the Tarnak watershed, stretches the great road to Cabul, the same which was traversed by Nott in 1842, and by Stewart and, more recently, by Roberts in 1880. Between this and the direct route to Pishin is a road, well known, though never yet traversed by a British force, which leads through Maruf to the Kundar river and the Guleri Pass into the plains of Hindustan at Dera Ismail Khan. This is the most direct route to northern India, but it involves the passage of some rough country, where lies the great watershed between the basins of the Helmand and the Indus. But the best known road from Kandahar to India is that which stretches across the series of open stony plains interspered here and there with rocky hills of irregular formation leading to the foot of the pass across the Kojak range, on the far side of which from Kandahar lies the valley of Pishin. The passage of the Kojak involves a rise and fall of some 2,300 feet, but an excellent road now crosses the pass. Between the Pishin valley and India are several routes, all more or less open to a force equipped for mountain warfare, of which the best known are the Bolán and the Chappar (or Nari) passes from the plateau of Afghanistan to the plains of Sind at Jacobabad; and the Zhób and the Bóri valley routes leading through **the Sulimani range** to Dera Ismaïl and Dera Ghazi Khan respectively. The Bōri valley was the line followed by Sir M. Biddulph in 1879, and the city is a sort of focus of all the direct routes converging from the wide-stretching western frontier of India toward Herat and Persia, and the fortress of Kandahar gives protection on the one hand to trade between Hindustan and Herat, and on the other it lends to Cabul security from Herat invasion.

Kandahar is approximately a square-built city, surrounded by a wall of about three and three-quarter miles circuit, and from twenty-five to thirty feet high, with an average breadth of fifteen feet. Outside the wall is a ditch ten feet deep. The city and its defenses are entirely mud-built, with no pretensions to architectural beauty. There are four main streets crossing each other nearly at right angles, the central "chouk" being covered with a dome. These streets are wide and bordered with trees, and are flanked by shops with open fronts and verandas much after the universal fashion of the East. There are no buildings of any great pretension in Kandahar, a few of the more wealthy Hindus occupying the best houses. The tomb of Ahmed Shah is the only attempt at monumental architecture. This, with its rather handsome cupola, and the twelve minor tombs of Ahmed Shah's children grouped around, contains a few good specimens of fretwork and of inlaid inscriptions. The four streets of the city divide it into convenient quarters for the accommodation of its mixed population of Duranis, Ghilzais, Parsiwans, and Kakuris, numbering in all some 30,000 souls. Of these the greater proportion are the Parsiwans.

It is reckoned that there are 1,600 shops and 182 mosques in the city. The walls of the city are pierced by the four principal gates of "Cabul," "Shikarpur," "Herat," and the "Idgah," opposite the four main streets, with two minor gates, called the Top Khana and the Bardurani respectively, in the western half of the city.

About four miles west of the present city, stretched along the slopes of a rocky ridge, and extending into the plains at its foot, are the ruins of the old city of Kandahar as it existed until it was sacked and plundered by Nadir Shah in 1738. From the top of the ridge a small citadel overlooks the half-buried ruins. On the northeast face of the hill forty steps, cut out of solid limestone, lead upward to a small dome-roofed recess, which contains some interesting Persian inscriptions cut in relief on the rock, recording particulars of the history of Kandahar, and defining the vast extent of the kingdom of the emperor Baber. Popular belief ascribes the foundation of the old city to Alexander the Great.

Although Kandahar has long ceased to be the seat of government, it is nevertheless by far the most important trade center in Afghanistan, and the revenues of the Kandahar province assist largely in supporting the chief power at Cabul. There are no manufactures or industries of any importance peculiar to Kandahar, but the long lines of bazaars display goods from England, Russia, Hindustan, Persia, and Turkestan, embracing a trade area as large probably as that of any city in Asia. The customs and town dues together amount to a sum equal to the land revenue of the Kandahar province, which is of considerable extent, stretching to Pul-i-Sangin, ten miles south of Khelat-i-Ghilzai on the Cabul side, to the Helmand on the west, and to the Hazára country on the north. Kandahar has a stormy history. Sultan Mahmud of Ghazni took it in the eleventh century from the Afghans, who then held it. In the beginning of the thirteenth century it was taken by Jenghiz Khan, and in the fourteenth by Timur. In 1507 it was captured by the emperor Baber, but shortly afterward it fell again into Afghan hands, to be retaken by Baber in 1521. Baber's son, Humayun, agreed to cede Kandahar to Persia, but failed to keep his word, and the Persians besieged the place unsuccessfully. Thus it remained in the possession of the Moghuls till 1625, when it was taken by Shah Abbas. Aurungzebe tried to take it in 1649 with 5,000 men, but failed. Another attempt in 1652 was equally unsuccessful. It remained in Persian possession till 1709, when it was taken by the Afghans, but was retaken after a two-years' siege by Nadir Shah. Nadir Shah was assassinated in 1749, and immediately on hearing the news of his death Ahmed Shah (Abdalli) seized Nadir Shah's treasure at Kandahar, and proclaimed himself king, with the consent, not only of the Afghans, but, strange to say, of the Hazáras and Baluchis as well. He at once changed the site of the city to its present position, and thus founded the Afghan kingdom, with modern Kandahar as its capital. Ahmed Shah died in 1773, and was succeeded by his son Taimur, who died in 1793, and left the throne to his son Zamán Shah. This prince was deposed by his half-brother Mahmud, who was in his turn deposed by Shah Suja, the full brother of Zamán Shah. After a short reign Shah Suja was compelled to abdicate from his inability to repress the rising power of Fatteh Khan, a Barakzai chief, and he took refuge first with Runjit Singh, who then ruled the Punjab, and finally secured the protection of British power. Afghanistan was now practically dismembered. Mahmud was reinstated by Fatteh Khan, whom he appointed his vizier, and whose nephews, Dost Mahommed Khan and Kohn dil Khan, he placed respectively in the governments of Cabul and Kandahar. Fatteh Khan was barbarously murdered by Kamrán (Mahmud's son) near Ghazni in 1818; and in retaliation Mahmud himself was driven from power, and the Barakzai clan secured the sovereignty of Afghanistan. While Dost Mahommed held Cabul, Kandahar became temporarily a sort of independent chiefship under two or three of his brothers. In 1839 the cause of Shah Suja was actively supported by the British. Kandahar was occupied, and Shah Suja reinstated on the throne of his ancestors. Dost Mahommed was defeated near Cabul, and, after surrender to the British force, was deported into Hindustan. The British army of occupation in southern Afghanistan continued to occupy Kandahar from 1839 till the autumn of 1842, when General Nott marched on Cabul to meet Pollock's advance from Jalalabad. The cantonments near the city, built by Nott's division, were repaired and again occupied by the British army in 1879, when Shere Ali was driven from power by the invasion of Afghanistan, nor were they finally evacuated till the spring of 1881. See AFGHANISTAN.

KÁNDÍ, a town in Murshidábád district, Bengal, India, with a population of 12,016.

KANDY, a town of Ceylon, formerly the capital of a kingdom of the same name, situated toward the heart of the island, seventy-four and three-fourths miles by rail from Colombo. It lies around the margin of an artificial lake constructed by the last king of Kandy in 1806, and is beautifully surrounded by hills. The most striking objects of interest are the temples (of which twelve are Buddhist and four Brahman), tombs of the Kandian kings, and the various buildings of the royal residence, partly allowed to fall into disrepair, partly utilized by the government. Pop. (1901), 26,522.

KANE, ELISHA KENT, American traveler, scientist, and arctic explorer, was born in Philadelphia, on February 3, 1820. He obtained his doctor's degree in 1842, having already acquired a reputation in physiological research. In 1843 Kane entered the United

States navy as surgeon, and was appointed to the *Brandywine*, commissioned to carry Mr. Webster as United States minister to China. While the vessel remained at Rio Janeiro the restless and eager Kane made a journey to the skirts of the Andes and explored their geology. Leaving the ship again at Bombay, he indulged his irrepressible exploring proclivities by a journey up country, rejoining his ship at Ceylon. On his arrival at his destination, Macao, he provided a substitute for his post in the embassy, crossed and explored the island of Luzon, visited the mysterious volcano of Tael, and, amid many difficulties, descended its steep crater, bringing up with him specimens of its lava. Finally resigning his position on the embassy, he practiced for a time at Whampoa, where he was stricken down by rice fever. In August, 1844, he left China, and, returning by India (where he visited the Himalayas), Persia, Syria, Egypt, Greece, Austria, Germany, and Switzerland, reached home in 1846. In May of that year he was ordered to the west coast of Africa, where he visited the kingdom of Dahomey, and caught the African fever, which told severely on his constitution. On his return in April, 1847, he exchanged the naval for the military service, and was sent to join the United States army in Mexico, where he had some extraordinary adventures in endeavoring to reach his destination, and where he was again laid down with fever. In February, 1849, he was presented with a sword by the city of Philadelphia, and in the same year made a visit to the Mediterranean and afterward the West Indies. On the fitting out of the first Grinnell expedition, in 1850, to search for Sir John Franklin, Kane was appointed surgeon and naturalist under Lieutenant De Haven, who commanded the two ships, the *Advance* and *Rescue*. The expedition left New York on May 22d; and after an absence of sixteen months, during nine of which the ships were ice-bound, they returned without having found any trace of the missing vessels. Kane was in feeble health, but worked on at his narrative of the expedition, which was published in 1854, under the title of *The United States Grinnell Expedition in Search of Sir John Franklin*. He also read a paper at the American Geographical Society on an *Open Polar Sea*, a chimera which was to play so important and delusive a rôle in subsequent Arctic explorations. Kane was determined not to give up the search for Franklin, but the government refused all help. In spite of feeble health, he traveled through the United States lecturing to obtain funds, and gave up his pay for twenty months. Mr. Grinnell again came to the rescue, with the brig *Advance*, which was equipped with the help of Mr. Peabody and some of the learned societies. It sailed in the end of June, 1853, and on August 23d reached 78° 41′ in Rensselaer Bay, off the coast of Greenland, where it remained fast during the whole time the expedition was out. During the first winter a sledge party was sent out, and reached 79° 50′, though at the expense of terrible sufferings. During the second winter the expedition suffered greatly from want of food and fuel, as well as from scurvy. Still Kane carried on with incessant diligence his scientific observations—magnetic, meteorological, astronomical, and tidal; and the results were afterward published in the *Smithsonian Contributions to Knowledge*, vols. x.-xiii., 1858. One of the most notable incidents of this expedition was the journey made by Morton, one of the staff, up Kennedy Channel, as far as Cape Independence, in 81° 22′ N. latitude, whence he saw what he and Kane firmly believed to be an "open polar sea." No doubt a large area of open water was seen, but a permanent open sea in this direction has long ago been proved a myth, though doubtless the constant shiftings of the ice often leave considerable areas of water uncovered at continually shifting points. After the endurance of the greatest hardships, it was finally resolved to abandon the ship, which was done on May 17, 1855, Upernavik being reached after many difficulties on August 5th. Kane reached home in October in good health, and set himself at once to write the narrative of his expedition, which was published in 1856. In October of the same year he left Philadelphia for England in search of health. From England he went to Cuba, where he died at Havana on February 16, 1857, at the early age of thirty-seven.

KANEFF, or KANIEFF, a town in Russia, in the Kieff government, on the Dnieper, 141 miles southeast of Kieff. Population about 10,000.

KANGAROO. When Captain Cook, during his first memorable voyage of discovery, was detained, for the purpose of refitting his ship, at Endeavor river, on the northeast coast of Australia, a strange-looking animal, entirely unknown to them, was frequently seen by the ship's company; and it is recorded in the annals of the voyage that, on July 14, 1770, "Mr. Gore, who went out this day with his gun, had the good fortune to kill one of the animals which had been so much the subject of our speculation, * * * and which is called by the natives kanguroo," a name which, though it does not appear to be known to any of the aboriginal tribes of the country, has been adopted for this animal in all European languages, with only slight modifications of spelling. With the exception of a passing glimpse in the beginning of the same century by the Dutch traveler Bruyn of some living examples of an allied species, this was the first introduction to the civilized world of any member of a group of animals now so familiar. The affinities of the species, skins of which were brought home by Captain Cook and subsequent voyagers, were recognized by Schreber as nearer to the American opossums (then the only known marsupials) than to any other mammals with which zoologists were acquainted, and consequently it was placed by him, in his great work on the Mammalia, then in the course of publication, in the genus *Didelphis*, with *gigantea* for a specific designation—the latter having been bestowed upon it by Zimmerman under the impression that it was a huge species of jerboa. Soon afterward (1791) Dr. Shaw very properly formed a new genus for its reception, which he named *Macropus*, in allusion to the peculiar length of its hind foot. By the name thus formed, *Macropus giganteus*, this kind of kangaroo has ever since been known in zoölogical literature.

Further explorations in Australia and the neighboring islands have led to the discovery of a very considerable number of species, which are now included in the family *Macropodidæ*, one of the subdivisions of the order *Marsupialia*, for the characters of which see MAMMALIA.

The *Macropodidæ*, or kangaroos, taken as a whole, form a very well marked family, easily distinguished from the remaining members of the order by their general conformation, and by peculiarities in the structure of their limbs, teeth, and other organs. They vary in size from that of a sheep down to a small rabbit. The head, especially in the larger species, is small, compared with the rest of the body, and tapers forward to the muzzle. The shoulders and fore limbs are feebly developed, and the hind limbs of disproportionate strength and magnitude, which gives them a peculiarly awkward appearance when moving about on all fours, as they occasionally do when feeding. Rapid progression is, however, performed only by the powerful hind limbs, the animal covering the ground by a series of immense bounds, during which the fore part of the body is inclined forward, and balanced by the long, strong, and tapering tail, which is carried horizontally backward. When not moving they often assume a perfectly upright position, the tail aiding the two hind legs to form a sort of supporting tripod, and the front limbs dangling by the side of the chest. This position gives full scope for the senses of sight, hearing, and smell to warn of the approach of enemies, from which they save themselves by their bounding flight. The fore paws have five distinct digits, each armed with a strong, curved claw. The foot of the hind limb is quite different, and very peculiar in construction, being extremely long and narrow, and (with only one, lately discovered, exception) without any hallux or great toe. It consists mainly of one very large and strong toe, corresponding to the fourth of the human or other typically developed foot, ending in a strong curved and pointed claw. Close to the outer side of this lies a smaller fifth digit, and to the inner side two excessively slender toes (the second and third), bound together almost to the extremity in a common integument. The two little claws of these toes, projecting together from the skin, may be of use in scratching and cleaning the fur of the animal, but the toes must have quite lost all connection with the functions of support or progression.

The dental formula, when completely developed, is *incisors* $\frac{3}{1}$, *canines* $\frac{1}{0}$, *premolars* $\frac{2}{2}$, *molars* $\frac{4}{4}$ on each side, giving a total of thirty-four teeth.

The number of vertebræ is—in the cervical region seven, dorsal thirteen, lumbar six, sacral two, caudal varying according to the length of the tail, but generally from twenty-one to twenty-five.

The stomach is of large size, and very complex, its walls being puckered up by longitudinal muscular bands into a great number of sacculi, like those of the human colon. The alimentary canal is long, and the cæcum well developed. All the species have a marsupium or pouch formed by a fold of the skin of the abdomen, covering the mammary glands with their four nipples. In this pouch the young (which, as in other marsupials, leave the uterus in an extremely small and imperfect condition) are placed as soon as they are born; there their growth and development proceed; and to it they resort temporarily for the purpose of shelter, concealment, or transport, for some time after they are able to run and jump about the ground and feed upon the same herbage which forms the nourishment of the parent. During the early period of their sojourn in the pouch, the blind, naked, helpless young creatures (which in the great kangaroo scarcely exceed an inch in length) are attached by their mouths to the nipple of the mother, and fed by milk injected into their stomach by the contraction of the muscle covering the mammary gland.

The kangaroos are all vegetable feeders, browsing on grass and various kinds of herbage, the smaller species also eating roots. They are naturally timid, inoffensive creatures, but the larger ones when hard pressed will turn and defend themselves, sometimes killing a dog by grasping it in their fore paws, and inflicting terrible wounds with the sharp claws of their powerful hind legs, sustaining themselves meanwhile upon the tail. The great majority are inhabitants of Australia and Tasmania, forming one of the most prominent and characteristic features of the fauna of these lands, and in the scenery of the country, as well as the economy of nature, performing the part of the deer and antelopes in other parts of the world, which are entirely wanting in Australia. They were very important sources of food-supply to the natives, and are hunted by the colonists, both for sport and with a view to their destruction, on account of the damage they naturally do in consuming the grass, now required for feeding cattle and sheep. Notwithstanding this, they have in some districts increased in numbers, owing to the suppression of their former enemies, the aborigines and the dingo or native dog. A few species are found in New Guinea and the adjacent islands, which belong, in the zoölogical sense, to the Australian province, beyond the bounds of which none have been found either existing or in a fossil state.

KÁNGRA, a district in the lieutenant-governorship of the Punjab, India, with an area of 8,988 square miles. Kángra district comprises a vast tract, extending eastward from the plain country of the Bári and Jalandhar Doábs, across two distinct Himálayan ranges, far into the heart of Tibet. It naturally falls into three parts—the sub-Himálayan country of Kángra proper, the central valleys of Kullu and Bangáha, and the rugged outer region of the Tibetan slope.

The census of 1898 disclosed a population of 743,882 (393,571 males and 350,311 females)—83 to the square mile. The Hindus numbered 693,505; Mahometans, 48,613; Síkhs, 1,314; Christians, 277; and "others," 173. The six municipal towns with their population are —Núrpur, 7,151; Kángra, 6,344; Haripur, 3,839; Sujanpur Tira, 3,393; Jawála-mukhi, 2,847; Dharmsala, 2,024. The famous Hindu temple of Nágarkot at Kángra town is one of the oldest and most wealthy shrines in India, and twice exposed the district to the plunder of the Mahometans.

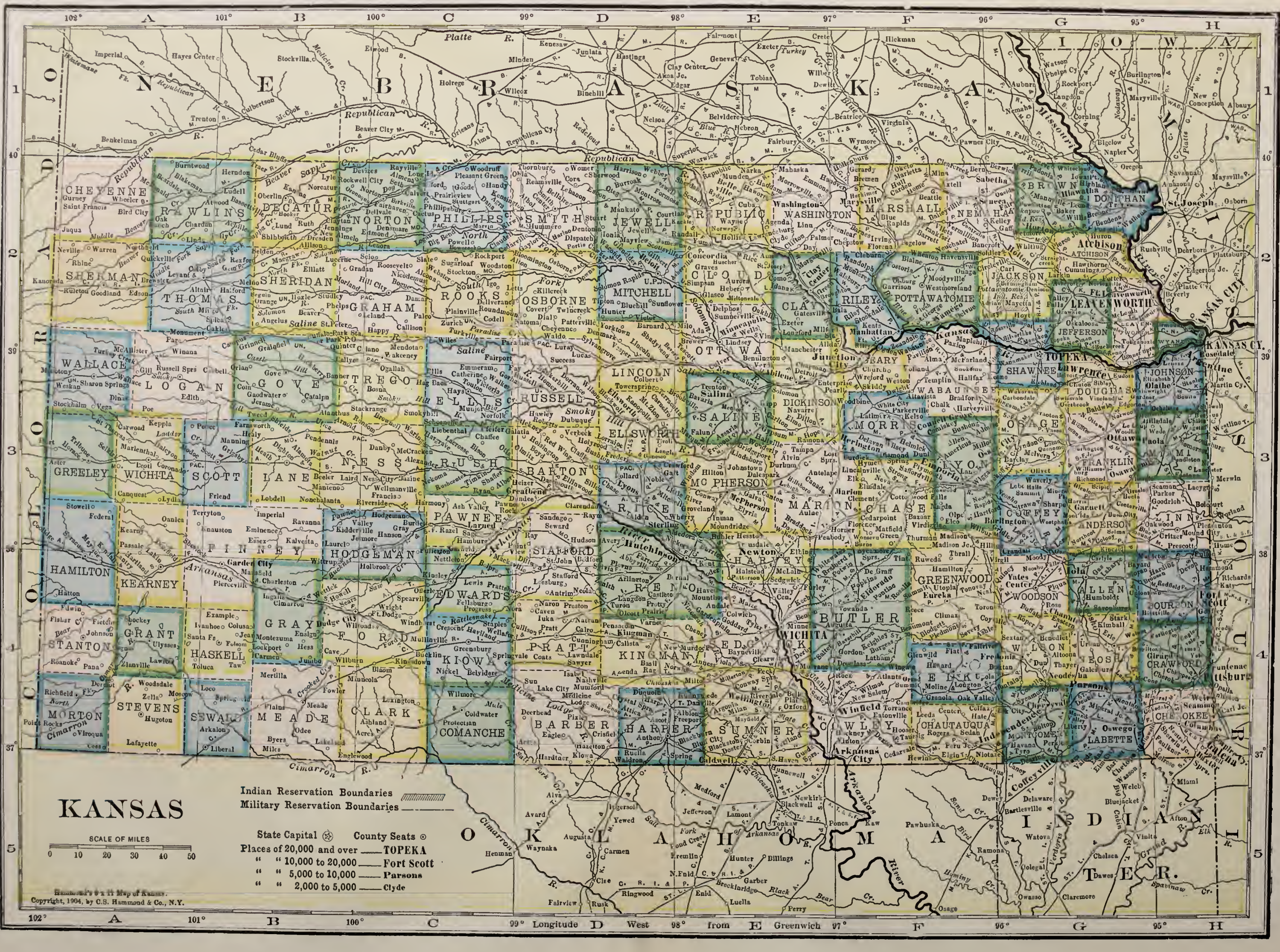
KANIZSA, NAGY (*i.e.*, "Great"), a market-town of Hungary, in the trans-Danubian county of Zala, lies thirty-one miles north-northeast of Kopreinitz, and at the junction of the lines of railway from Sopron (Oedenburg) and Székesfehérvár (Stuhlweissenburg). Population (1901), about 21,000.

KAN̄KÄKĖE, the chief city and county seat of Kankakee county, Illinois, is situated on the north bank of the Kankakee river, fifty-six miles south of Chicago. It is the center of a very rich and fertile farming district, and has a large trade in agricultural produce. It has fine water-power, and, being within easy reach of extensive coal fields and deposits of bog-iron ore, does a large manufacturing business. It is also somewhat noted as a summer resort. Population (1900), 13,595.

KANO, a town of central Africa, at the head of a province of the kingdom of Sokoto, about 230 miles east of Sokoto and 360 miles west of Kuka. Population, about 100,000.

KĂNSAS, the twenty-first State of the American Union, is bounded on the north by Nebraska, on the east by Missouri, on the south by Indian Territory, and on the west by Colorado. The State is nearly rectangular in shape, with a breadth of about 210 miles from north to south, and a length of 400 miles from east to west. It contains an area of 82,080 square miles, or 52,043,520 acres.

Kansas is an undulating plain, gently sloping from west to east, at an average of nearly seven feet per mile. There is also an inclination from north to south, as indicated by the course of the rivers, which flow southerly as well as easterly, but never northerly or westerly, except for short distances from local causes. The mouth of the Kansas river, at the east line of the State, is 750 feet above the sea-level; the average altitude of the western boundary is about 3,500 feet. The broad prairie surface is diversified by an endless succession of valleys and woodlands. The great central valley is traversed by the Kansas or Kaw river, which, inclusive of the Smoky Hill branch, extends the entire length of the State. Lateral valleys on the north are formed by the Saline, Solomon, Republican and Blue rivers, and other smaller streams. Another broad valley is formed in the southern half of the State by the Arkansas river, with



KANSAS

SCALE OF MILES
0 10 20 30 40 50

Indian Reservation Boundaries
Military Reservation Boundaries

State Capital ⊛ County Seats ⊙
Places of 20,000 and over —— TOPEKA
" " 10,000 to 20,000 —— Fort Scott
" " 5,000 to 10,000 —— Parsons
" " 2,000 to 5,000 —— Clyde

Hammond's 8 x 11 Map of Kansas.
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lateral valleys on the north, traversed by the Walnut, Little Arkansas, Pawnee Fork, and other streams. The southeastern portion contains the important Neosho valley, and the smaller valleys of the Osage and Verdigris. In the extreme southwest and along the southern boundary are the valley of the Cimarron, and a network of the southern tributaries of the Arkansas. Numerous small affluents of the Missouri enrich and diversify the northeastern quarter of the State. The streams of Kansas are usually fed by perennial springs, and, as a rule, the eastern and middle portions of the State are well watered. The western part is more elevated, and water is less abundant.

The surface presents three distinct geological sections. The eastern portion of the State belongs to the Carboniferous system, in which are found inexhaustible beds of bituminous coal, often at shallow depths or cropping out on the surface. The central portion belongs to the Triassic formation, with magnesian limestone, ferruginous sandstone, and gypsum as the representative rocks. Magnesian limestone, known as dolomite, is especially plentiful along the Blue, Republican, and Neosho rivers and their tributaries. This beautiful stone, resembling white, gray, and cream-colored marble, is exceedingly useful for building purposes. It crops out in the bluffs in endless quantities, and is easily worked. The western portion of the State belongs to the Cretaceous formation, in which chalks and a species of native quicklime are very prominent in the river bluffs. The white and cream-colored chalks are much used for building purposes, but the blue is usually too soft for exposure to the weather. The quicklime as quarried from the bluffs slakes perfectly, and with sand makes a fairly good mortar, without calcination or other previous preparations. Lead-mines are extensively worked in the southeastern portion of the State, and prosperous towns and cities are growing up in connection with these mines. In the central region, salt is produced from wells, and appears in occasional marshes. Salt industries are carried on at Solomon City, near the mouth of the Solomon river, and an excellent brine is obtained at Junction City. The salt of the southwest is found in beds and dry incrustations, varying in thickness from a few inches to two feet. The salts of Kansas are remarkably free from lime and other impurities. Gypsum is found in beautiful crystalline form in extensive quarries, but it has not been much utilized. The lignite found near the Colorado line makes a valuable domestic fuel.

The climate of Kansas is exceptionally salubrious. Extremes of heat and cold occur, as in all open prairie countries, but as a rule the winters are dry and mild, while the summer heats are tempered by the perpetual prairie breezes. The summer nights are invariably cool and refreshing. The mean annual temperature at Fort Riley for twenty-three years has been 53°. The highest temperature there during the same period was 98° and the lowest 12° below zero. The average annual rainfall at the city of Lawrence for six years was 32.68 inches, the heaviest rainfalls occurring in May, June, July, and August; the lightest in November, December, January, and February.

The soil of the upland prairies is generally a deep, rich clay loam, of a dark color. The bottom-lands near the streams are a black, sandy loam; and the intermediate lands, or "second bottoms," show a rich and deep black loam, containing very little sand. These soils are all easily cultivated, free from stones, and exceedingly productive. There are exceptional spots on the upland prairies composed of stiff clay, not so easily cultivated, but very productive when properly managed and enriched. In the early history of the country the prairies were covered with the short "buffalo grass," very nutritious for pasturage, on which immense herds of buffalo and other animals subsisted, but utterly unfit for hay. With the disappearance of the buffalo, and as the country is settled and cultivated, the short buffalo grass gives place to the tall blue stem and other bladed grasses valuable alike for pasture and for hay. Timber is abundant along the streams in the eastern section of the State, but is less plentiful in the central portion, and very scarce in some parts of the west. The varieties of timber embrace oak, elm, black walnut, cottonwood, mulberry, box-elder, willow, hickory, sycamore, white ash, and other hard and soft woods. The aggregate area devoted to field crops in 1887, was 15,196,086 acres; for 1888, 15,466,597; while for 1899 it was 18,394,271 acres, showing an increase in 1888 over 1887 of 270,511 acres, and an increase in 1899 over 1888 of 2,927,674 acres. In 1899 the acreage of corn was 8,266,018, of wheat 3,803,818, of oats 900,353, and of flax 192,167 acres.

The crops of 1899 were reported as follows: Corn, 229,937,430 bushels; wheat, 38,778,450 bushels; oats, 24,469,980 bushels; barley, 1,474,150 bushels; rye, 807,260 bushels; buckwheat, 15,203 bushels; kafir corn, 3,063,781 bushels; flaxseed, 1,417,770 bushels; grass seed, 244,523 bushels; hay and forage, 7,235,136 tons; broom corn, 11,813,310 pounds; potatoes, 8,091,745 bushels; sweet potatoes, 474,810 bushels; and onions, 143,832 bushels.

The bright climate and pure atmosphere are admirably adapted to the growth of the apple, pear, peach, plum, grape, and cherry. The smaller fruits also, with scarce an exception, flourish finely. Trees never suffer from sodden or water-soaked roots, and very seldom from the winter's cold, when reasonable judgment and care have been exercised in selecting and managing the grounds. At a national exhibition in Philadelphia in 1869 the great gold medal of the National Pomological Society was awarded to Kansas "for a collection of fruits unsurpassed for size, perfection, and flavor;" and similar awards have been made to Kansas fruits at later exhibitions. In November, 1862, the American Institute, at its great show, awarded a diploma for 190 varieties of apples grown in Kansas, as the largest and handsomest exhibited. At the International Exhibition at Philadelphia in 1876, Kansas exhibited ninety-six varieties of apples, and received the diploma of the centennial commission.

Live Stock.—The wild prairies, with their nutritious grasses for hay and grazing and their never-failing springs of pure water, make the State a very paradise to the herdsman and stock-raiser. The following are the statistics for 1900: Horses, 979,695; mules and asses, 122,491; milch cows, 676,456; other cattle, 3,814,622; sheep, 179,907; swine, 3,594,859. Total value of live stock, $186,078,762.

The value of animals slaughtered or sold for slaughter in 1899 was $70,460,808; wool, $247,895; butter, milk, and cheese, $11,782,902; poultry and eggs, $13,728,294. The total of all field crops was $113,522,693.

Kansas City, Kan., is an important packing-house center. The great herds of buffalo which formerly overran the plains, have disappeared; the elk is gone, and deer and other game are less plentiful than formerly. There remain, however, the rabbit, hare, turkey, prairie chicken, quail, and the usual variety of migratory waterfowl, to gratify the sportsman. The numerous streams are well supplied with fish of choice varieties and of unusually large size.

There is perhaps no tract of country of equal extent better supplied with available water power than Kansas. The streams, which are abundant, are fed by living springs, and the inclination of the country insures uniformly rapid currents. Most of the streams maintain a good flow of water in the driest seasons, and in case of heavy rains many of them "underflow" the adjacent bottom lands, saturating the permeable substratum of the country with the surplus water, which in time drains out and feeds the subsiding streams. This feature is particularly true of the Saline, Solomon, and Smoky Hill rivers. The Smoky Hill river has not risen above the banks of its deep channel at Junction City since 1869, while at the lowest stage it is capable of driving large flouring-mills, having half a dozen sets of burrs. A dam on the Kansas river, at Lawrence, supplies a water-power capable of developing a great manufacturing center. In the eastern section of the State, where coal is plentiful, steam power is much used, especially in the manufacture of iron. At Leavenworth there are manufactories of iron bridges, engines, boilers, stoves, railroad iron, and miners' tools. There are also manufactories of wagons, carriages, carpets, soaps, paints, and cement, at Leavensworth, Fort Scott, Lawrence, Columbus, Ottawa, and other places. At Topeka, Parsons, Armstrong, and Argentine there are rolling-mills and railroad repair shops, while planing-mills, tanneries, cheese factories, and pork-packing establishments are found in various localities.

There are numerous railroads in the State, with an aggregate length of completed track of 8,806 miles. Kansas has an eastern front of 150 miles on the Missouri river, which is navigable for steamboats of all sizes. The internal rivers of the State are not utilized for commercial purposes, though the Kansas was formerly considered navigable to Fort Riley, near the mouth of the Republican river, and steamboats have ascended the Smoky Hill to the mouth of the Saline, about fifty miles farther west. By means of these railroads and the Missouri river, immense quantities of wheat, corn, cattle, and swine are sent from Kansas to the eastern markets; flour is sent south, southwest, and west; and butter, poultry, and eggs, with large quantities of vegetables, hay and garden produce, to the western mining regions.

The public schools are liberally endowed and supported. Two sections of land (1,280 acres) are set apart in each survey township of 36 sections for school fund purposes. There are in the State 9,297 public school buildings, and the value of public school property is $11,665,511. The teachers employed number 11,428. The pupils of school age are estimated from statistics of 1890 at 391,420, 237,900 of whom are in actual attendance. The expenditure for school purposes in 1899 was $4,360,472, the receipts were $5,696,659. The State supports a university at Lawrence, and a normal school at Emporia; and the agricultural college at Manhattan is endowed by an apportionment of public lands. There are also State institutions for the education of the blind, and the deaf and dumb, and for the care of the insane. A reform school for juvenile offenders is established at the State capital. All the usual religious denominations are represented.

In Kansas, as in all the States of the American Union, the government is vested in three departments, legislative, executive, and judicial. The governor is elected for a term of two years. The legislature consists of a senate and house of representatives. The members of the house are elected for two years, and members of the senate for four. The judiciary consists of a State supreme court and subordinate district courts. The judges are all elected by a direct vote of the people.

The population in June, 1900, was 1,470,495. The State is divided into 105 counties. The following are the largest towns, with population in 1900: Kansas City, 51,418; Topeka, 33,608; Wichita, 24,671; Leavenworth, 20,735; Atchison, 15,722; Fort Scott, 10,322; Hutchinson, 9,379; Lawrence, 10,862. Topeka, the State capital, is advantageously situated, and is one of the most flourishing towns in the State.

Kansas belongs to that immense tract of country, purchased by the American Government from France in 1803, known as the Louisiana purchase. Prior to 1854 it was in the hands of various Indian tribes, some native, and others which had been removed from the older States. It was organized and opened for settlement as a territory by Act of Congress in May, 1854, in the midst of a heated contest on the slavery question. The slaveholders and the friends of freedom at once began a vigorous contest for the occupancy and control of the new territory, and thus it was that Kansas became the vanguard in the great struggle which resulted in the overthrow of slavery in the United States. Before the formal beginning of the war, societies were organized by the rival settlers and their friends in the States on both sides of the slavery question, and even rival legislatures were elected and convened. The discussions frequently resulted in personal violence, and the greatest excitement prevailed till the breaking out of the Civil War. Kansas was admitted into the Union as a State in January, 1861, and took an active part in furnishing troops for the suppression of the rebellion. The State was frequently invaded, and the city of Lawrence was sacked and burned in August, 1863. Since the overthrow of slavery, Kansas has shared fully in the general progress of the country.

KANSAS CITY, the county seat of Jackson county, and the second city in size in the State of Missouri, is one of the most important and thriving cities in the West. The Kansas City railways control largely the railroad mileage of the United States; there are more miles of street railroad in operation than in any other city of its population, and the postoffice makes a larger percentage of profit for the government than any other office. It ranks high among American cities in packing-house and stockyards business, in the number of railroads entering its union depot, and in registered mail business; first in agricultural implement business, and in extent and resources of tributary territory. It was laid out two and one-half miles below the State line between Missouri and Kansas, on the south bank of the Missouri river, in 1838, at the foot of a line of commanding bluffs, which have since become the site of the retail business and the residence portion of the city. The bottom-lands near the river-level are occupied by the railroads, the warehouses, the wholesale houses, and the manufacturing establishments. The surface of the uptown portion of the city is undulating, causing some very heavy grading along the business streets, but furnishing most romantic and delightful sites for residences, both inside and without the city limits. The natural drainage is excellent, and the system of sewerage adequate, so that the health of the city is remarkably good. The elevation of the levee is 725 feet above sea level. The climate is dry and moderate, and, while the summer heat is often high, the dryness of the atmosphere and the breezes from the western prairies prevent sultriness. For a number of years the city's growth was slow. Its real growth commenced with the opening to settlement of the territories of Kansas and Nebraska; so that between 1854 and 1860 its population had increased from 400 to nearly 7,000.

The war of the rebellion had so disastrous an effect upon Kansas City as well as upon the whole State of Missouri, that in 1865 its population had fallen off to about 3,000 people, and its business was almost nothing. Not a railroad reached its borders until 1866, but immediately after the close of the war the city took on new life. Railroads were projected and built in all directions, the Missouri river was speedily spanned by the first bridge ever built across it. Stockyards, grain elevators, and packing houses, street railroads, water-works and gas-works, mercantile and manufacturing establishments, were constructed, and in 1870 the population, according to the United States census, had reached over 32,000. For several years after this, owing to the panic of 1873, matters of all kinds were dull, but in 1876 everything began to revive, and a term of most marvelous growth and prosperity ensued and continued for more than ten years, so that in 1897 the sales of real estate alone amounted to more than $120,000,000. Everything else maintained the same ratio of progress. Twenty-one railroads centered at its union depot, more than sixty trains per day crossed the Missouri river on the bridges, the packing of beef and pork had become enormous, the stockyards business extended from Kansas to Texas and New Mexico, the grain trade occupied the attention and capital of more than 100 firms, while the agricultural implement business had become the largest of any city in the United States. Other branches of trade, like dry goods, groceries, hardware, etc., were developed in the same proportion, while the population of the city was commonly estimated at 175,000. The horse-car lines have now given way to electric and cable lines over the city, while an elevated rapid transit railroad and electric and cable lines connect the city with its namesake on the other side of the State line.

A comparison of facts in regard to some of the prominent enterprises will show the present condition and advance of the city better than any other means.

In 1895, the city acquired its waterworks system at a cost of over three million dollars, and since the purchase it has earned and retired $150,000 of the bonds; it has also laid and paid for 60 miles of new water mains. It has also recently built the St. George hospital, a new work-house, and made considerable additions to the city hospital.

Kansas City leads all Western cities in the percentage of increase in bank clearings, and its banks stand tenth among the banks of the country in actual amounts cleared per week. The following table shows the capital stock of the most important banks of the city:

American National Bank	$1,250,000
City National Bank	200,000
First National Bank	250,000
German-American Bank	250,000
Union National Bank	600,000
National Bank of Commerce	2,000,000
Traders Bank of Kansas City	1,000,000
National Exchange Bank	250,000
Kansas City State Bank	200,000
Stock Yards Bank of Commerce	....
Union Avenue Bank of Commerce	....
Western Exchange Bank	....
Missouri Savings Association Bank	....
New England National Bank	....

	1889.	1900.
Deposits	$ 24,395,655	$ 40,000,000
Surplus	1,033,500	2,355,000
Clearings	449,479,474	560,542,269
Capital of leading investment companies	11,370,000	19,868,400

While the rapidity of growth and the speculative spirit do not run so high at present as in 1887, the general prosperity of the city is constantly increasing. More railroads, finer business houses, more costly residences, greater and more important public improvements, heavier investments in banks, etc., show the confidence of the citizens and of outside capitalists in the certain and steady growth of the city into the metropolis of the Missouri Valley. The city limits already extend from the State line on the west to the Blue river on the east, and from the Missouri river on the north to Brush creek on the south.

The industrial and manufacturing trade of the city was in 1900 as follows:

All industries (1,797 in No.) aggregate capital	$26,437,307
Value of products for year 1900	$36,527,392
Average number of wage-earners	16,800
Total wages paid	$ 9,232,873

Flouring and grist mill products (1900)	$ 2,070,111
Foundry and machine shop products	$ 1,042,448
Malt liquor products	$ 1,309,027
Printing, job and book publishing	$ 1,187,253
Printing, newspapers and periodicals	$ 1,582,763
Men's clothing, factory products	$ 1,123,739
Men's clothing, custom work	$ 1,006,509
Carpentering	$ 3,204,811
Brick and stone masonry	$ 1,816,756
Paving and paving materials	$ 1,287,269

The total assessed valuation of property in 1901 amounted to $79,776,841. The civic revenue for the same year was $1,075,000, of which $797,768 was derived from taxation, and $215,000 from licenses. The total expenditure for the year was $1,135,549.

The city's bonded debt, April, 1902, amounted to $3,555,900. The rate of taxation in the city for general purposes for the year was eleven mills.

The public school system of Kansas City is regarded as unusually excellent, and its finances are in a very satisfactory condition. The value of the school property was, on June 30, 1899, $1,693,825, the thirty buildings being estimated at $853,852. At a late sale of 4 per cent. school bonds, a premium of a trifle less than 2.75 per cent. was paid for $200,000. There are seventy churches of various denominations, several of them having cost over $100,000 each. Several of the public institutions of the city own their own buildings, viz.: the Young Men's Christian Association, valued at $150,000; the Merchants' Exchange, $550,000; the Builders and Traders' Exchange, $100,000; the Real Estate and Stock Exchange, $50,000; the Stockyards Exchange, $125,000.

The city's electric and other tramway, about twenty in total number, lines traverse over sixty miles; the elevated railroad, about ten miles; cable lines, six and a half miles; steam motor lines (two), six miles, all double track, or nearly 150 miles single track. There are two bridges over the Missouri in use, and a third under construction. There are twelve gas wells, producing 3,200,000 cubic feet of gas per day. Coal has been struck at various depths in veins amounting to over six feet in thickness. There are nearly or quite 150 miles of water-mains within the city limits, and the water is brought from the Missouri river six miles above the city, after having been settled and purified in reservoirs, which, with the pumping-works, cost over $600,000.

The city government consists of the mayor, the two houses of the city council, and the board of public works. The various officers are elected for two years, by the Australian system of voting. The total number of registered voters at the last election was nearly 50,000.

The police and fire departments are very thoroughly organized, and consequently the city has been peculiarly fortunate in escaping both riots and disastrous fires. There is a board of park commissioners, which, though but recently constituted, has already devised numerous improvements. A line of steamboats has been placed on the Missouri river recently, in the interest of shippers and traders along it, and also as a check upon the railroads in the matter of transportation rates.

The grain trade of the city has increased very largely within the past year, there having been over 4,500,000 bushels of wheat handled in 1889, as against less than 1,500,000 in 1888; the receipts of corn for the same period were nearly 10,000,000 bushels, and of oats 4,200,000 bushels. This increase was due to the heavy crops in Kansas and Nebraska in 1889. The business in the precious metals, particularly silver, is rapidly increasing, the "Argentine" smelter having been largely added to and the "Turner" nearly finished. The "Chick" smelter is also under way. The ores of Colorado, New Mexico, and Arizona are the principal ones treated at present. Zinc and lead mining in Jasper and Morgan counties is receiving a great deal of attention from Kansas City capitalists, and a mining stock exchange has recently been organized and is in active operation.

The packing business still leads all others in Kansas City, amounting in 1889 to 400,000 head of cattle, 201,000 sheep, and 1,715,000 hogs; while the shipments of dressed meats alone amounted to 535,000,000 pounds for the same period.

The stockyards were also largely increased last year, as well as the Stockyards Exchange building, so that not only can 5,000 more cattle and 300 more carloads of hogs be cared for, but the fifty-seven firms dealing in stock can be better accommodated with office room. The receipts of the year were 1,220,767 cattle, 2,072,414 hogs, 371,470 sheep, and 34,523 horses and mules. In 1900, the value of the wholesale slaughtering and meat-packing trade of the city was over $73,200,000.

The newspapers of Kansas City are numerous, wide-awake, influential, and metropolitan in size and circulation. The principal morning papers are the *Times* (Democratic), the *Journal* (Republican), the *Globe* (Independent), and *Der Presse* (German Republican). The principal evening papers are the *Star* (Democratic Independent), the *Evening News* (Republican Independent), the *Post* (German Independent). Besides these there are scores of weekly religious, commercial, trades, society, and other papers, including three organs of the colored population.

The area of the city is about thirty-six square miles, and the population by the United States census of 1900 was 163,752.

The railroads now entering the city number twenty-nine, and radiate into nearly every portion of the splendid territory tributary to it; others are coming, as well as other electric lines. The city has of late inaugurated a fine system of parks and boulevards at large expense, and is about to improve sections of the town, at a cost of $600,000, acquiring for this sum the right to tear down and reconstruct portions of the city.

One of the boasts of Kansas City is its high social status, as shown by its beautiful and costly residences, three magnificent opera houses, lovely parks, elegantly paved streets and boulevards, fine libraries and art galleries, all of which, considering their newness, are highly creditable to the people of so young a city.

KANSAS CITY, a town of Kansas, adjoining the city of the same name in the State of Missouri. The two municipalities are practically one for commercial purposes, although separated by the State line, and each governed by its own officers. Most of the packing-houses and the stock-yards, which have done so much for the commercial development of Kansas City, are located on the Kansas side. Population (1900), 51,418.

KANT, IMMANUEL. So far as changes of external fortunes are concerned, the life of the greatest philosopher of the eighteenth century presents little or nothing of interest. Born April 22, 1724, at Königsberg, he passed a quiet and almost undisturbed existence within the narrow limits of his native place.

During his university course, which began in 1740, Kant was principally attracted toward mathematics and physics, doubtless through the influence of Knutzen, who then, as extraordinary professor, lectured on most branches of mathematics and also on philosophy.

In 1770 he obtained the chair of logic and metaphysics at Königsberg, and delivered as his inaugural address the dissertation *De Mundi Sensibilis et Intelligibilis Forma et Principiis.* Eleven years later appeared the *Kritik of Pure Reason*, the work toward which he had been steadily advancing, and of which all his later writings are developments.

In spite of its frequent obscurity, its novel terminology, and its declared opposition to prevailing systems, the Kantian philosophy made rapid progress in Germany. In the course of ten or twelve years from the publication of the *Kritik of Pure Reason*, it was expounded in all the leading universities, and it even penetrated into the schools of the Church at Rome. Young men flocked to Königsberg as to a shrine of philosophy. The Prussian Government even undertook the expense of their support. Kant was hailed by some as a second Messiah. He still pursued his quiet round of lecturing and authorship, and contributed from time to time papers to the literary journals. Of these, among the most remarkable was his review of Herder's *Philosophy of History*, which greatly exasperated that author, and led to a violent act of retaliation some years after in his *Metakritik of Pure Reason.*

In 1792 Kant, in the full height of his reputation, was involved in a painful collision with the government on the question of his religious doctrines. After the first part of his book, *On Religion within the Limits of Reason alone* had appeared in the *Berlin Journal*, the publication of the remainder, which treats in a more rational style of the peculiarities of Christianity, was forbidden. Kant, thus shut out from Berlin, availed himself of his local privilege, and, with the sanction of the theological faculty of his own university, published the full work in Königsberg. This incident, however, produced a very unfavorable effect on his spirits. He withdrew in 1794 from society; next year he gave up all his classes but one public lecture on logic or metaphysics; and in 1797, before the removal of the interdict on his theological teaching, he ceased altogether his public labors, after an academic course of forty-two years.

From the date of his retirement from the chair Kant declined in strength, and gave tokens of intellectual decay. His memory began to fail, and a large work at which he wrought night and day, on the connection between physics and metaphysics, was found to be only a repetition of his already published doctrines. On February 12, 1804, he breathed his last, having almost completed the eightieth year of his age.

KAOLIN, a name applied to the pure white clay which forms an important ingredient in the manufacture of porcelain, and which is, therefore, known also as *china clay.* Kaolin is found in Nebraska, and several of the Eastern States.

KAPURTHÁLA or KOPURTHELLA, a native state in the Punjab, India. Area, 600 square miles; estimated population, 300,000.

KARÁCHI. See Kurrachee. Pop. (1901), 115,407.

KARA-HISSAR is the name of several towns in Asiatic Turkey. (1) Afium Kara Hissar has been already noticed. (2) Eski Kara Hissar lies ten miles to the north of Afium. It is identified with the ancient Synnada, which in the time of Pliny was the chief town of a considerable district. The quarries of Docimia, which furnished the famous Synnadic or Docimitic marble, are about two and a half miles distant, and in the town numerous traces have been found of ancient sculpture in various stages of execution. (3) The eastern Kara-Hissar, usually distinguished by the prefix Shabin (*i.e.*, "alum"), is situated in the vilayet of Siwas, about seventy miles east of Niksar, on a northern tributary of the Lycus.

KARAITES, or Caraites, a Jewish sect of the Middle Ages, claiming to be distinguished by adherence to Scripture as contrasted with oral tradition. They have frequently been identified with the Sadducees or with the Samaritans, with neither of whom have they any historical connection or much spiritual affinity. The schism arose at Baghdad about the middle of the eighth century, and continued to be maintained until the time of the crusades. From this center the sect diffused itself thinly over Syria, spread into Egypt, and ultimately reached southeastern Europe. Anan, who is said to have died in 765 A.D., was the author of a commentary on the Pentateuch and other works in Talmudic Hebrew and Arabic—all of which, unfortunately, are lost; for our knowledge of the distinctive principles maintained by him we are thus left entirely dependent on the hostile indications of opponents.

KARAKORUM, or Karakoram, a name applied to a city, a mountain range, and a mountain pass in Central Asia. For the range and pass see Kuen-lun. The ancient city or rather camping-ground of Karakorum (the Caracaron of Marco Polo) was situated near the upper course of the Orkhon, a tributary of the Selenga.

KARAMZIN, Nikolai Mikhailovich, Russian historian, critic, novelist, and poet, was born at the village of Mikhailovka, in the government of Orenburg, on December 1 (old style), 1765. After residing some time at St. Petersburg, he went to Simbirsk, where he lived in retirement till induced by a friend to revisit Moscow. There finding himself in the midst of the society of learned men, he again betook himself to literary work. In 1789 he resolved to travel, and visited Germany, France, Switzerland, and England. On his return he published his *Letters of a Russian Traveler*, which met with great success. In 1789 he compiled the *Pantheon*, a collection of pieces from the works of the most celebrated authors ancient and modern. In 1802 and 1803 Karamzin edited the journal *The European Messenger*. It was not till after the publication of this work that he realized where his strength lay, and commenced his *History of the Russian Empire*. In order to accomplish the task, he secluded himself for some years. In 1816 he removed to St. Petersburg, where he spent the happiest days of his life, enjoying the favor of Alexander, and submitting to him the sheets of his great work, which the emperor read over with him in the gardens of the palace of Tzarskoë Selo. He did not, however, live to carry his work further than the eleventh volume, terminating it at the accession of Michael Romanoff, in 1613. He died May 22 (O.S.), 1826.

KARASUEN-BAZAR, a town of Russia, in the government of Taurida, near the rivers Tunas and Karasu, twenty-seven miles from Simpheropol on the road to Theodosia. Population about 18,000.

KARATCHEFF, a town of Russia, in the government of Orel, near the river Snezheti, fifty-nine miles northwest from Orel on the railway to Smolensk. Population, 12,000.

KARATEGIN, a country of Central Asia, now subject to Bokhara, consisting of a highland district between the Hissar and the Darwaz chains.

KARAULI, or Kerowly, a native state in Rájputana, India. It is entirely surrounded by the neighboring states, and has an area of about 1,260 miles, and an estimated population of 140,000.

KARCZAG, or Kardszag, a corporate town of Hungary, and formerly the capital of the district of Great Cumania (now included in the county of Jász-Nagy-Kun-Szolnok), lies about eighty-eight miles east-southeast of Budapest, with which city it is connected by railway. Population, 17,000, almost exclusively Magyars.

KÁRIKAL, a French town and settlement in India, situated on the southeast coast, within the limits of Tanjore district, with an area of fifty-two square miles and a population of 92,516.

KARMATHIANS, a Mohammedan sect, or secret order.

KARNAK. See Architecture, and Egypt.

KARNÁL, a district in the lieutenant-governorship of the Punjab, India. The area is 2,351 square miles. Karnál forms a portion of the low dividing ridge which separates the watersheds of the Indus and the Jumna.

The population in 1898 amounted to 610,927 (330,763 males and 280,164 females)—Hindus, 356,305; Mohammedans, 151,723; and "others," 93,604.

Karnál, a municipal town, the headquarters of the above district, with a population of 27,022.

KARNÚL, a district in Madras, India, with an area of 7,151 square miles. Two long mountain ranges, the Nallamalais and the Yellamalais, extend in parallel lines, north and south, through the center of the district. The principal rivers are the Tungabhadra and Kistna, which bound the district on the north.

The population in 1899 numbered 914,432, of whom 819,453 were Hindus, 60,579 Mohammedans, and about 3,844 Christians, chiefly Roman Catholics, whose principal station is at Polur. The principal towns are Carnúl (population 25,579), Nandial (9,378), Cumbum (7,137), Gúdur (5,825), Meddikera (8,586), Kodumrú (6,064), and Paikali (5,076).

The chief crops are rice, wheat, and other cereals, gram, cotton, tobacco, indigo, sugar-cane, betel, chillies, etc.

Karnúl, the headquarters of the above district, had a population in 1899 of 25,579. It is a hot, unpleasant town, built on rocky soil at the junction of the Hindri and Tungabhadra rivers.

KARS, a fortified town of Armenia, formerly at the head of a sandjak in the Turkish vilayet of Erzeroum, but since 1878 the center of a territory attached to the Russian governor-generalship of the Caucasus. At the northwest corner of the town, overhanging the river, rises the ancient citadel (the Itch Kaleh of the Turks), which in earlier times was a strong military post, but is now of almost no moment in a regular siege, being commanded completely by several of the surrounding eminences. The value of the position depends on the line of forts, and even this is greatly diminished by the fact that they are disposed in a circuit of about ten miles around the town. Of chief importance are the works on the Kara Dagh heights to the northeast and the line on the heights above the left bank of the river. The population of Kars was at one time estimated at 40,000; but in 1900 it had only about 21,500.

Though during the ninth and tenth centuries the seat of an independent Armenian principality, Kars has nothing to boast of beyond its military fame. The citadel, it would appear, was built by Amurath III., during the war with Persia, in the close of the sixteenth century. It was strong enough to stand a siege by Nadir Shah in 1731, and in 1807 it successfully resisted the Russians. After a brave defense it surrendered on June 23, 1828, to the Russian general Paskievitch, 11,000 men becoming prisoners of war. During the Crimean war the Turkish garrison, guided and stimulated by General Williams (afterward knighted as Sir W. Fenwick Williams of Kars) and other foreign officers, kept the Russians gallantly at bay during a protracted siege; but, after the garrison had been devastated by cholera, and food had utterly failed, nothing was left but to capitulate (November, 1855). The fortress was again stormed by the Russians in the war of 1877–78.

KARSHI, an important town of Central Asia, the center of a begship dependent on Bokhara. It is situated about eighty-five miles south-southwest of Samarkand, in a vast plain at the junction of two of the main confluents of the Kashkadarya, a river which, though fed by numerous mountain streams, soon loses itself in the sands. It is a large and straggling place, with a circuit of five miles, and the population within the walls amounts to 25,000.

KÁRWÁR, or CARWAR, the chief town and headquarters station of North Kánara district, Bombay, fifty miles southeast of Goa. Population, 15,000.

KASAN. See KAZAN.

KASANLIK, or KEZANLYK, a town of Roumelia, in the vilayet of Adrianople, is situated at the foot of the Balkans, about five miles south of the Shipka Pass, in a highly fertile plain watered by the Tundja and its numerous tributaries. The population is variously estimated at from 10,000 to 12,000. Two-thirds of these are Bulgarians and Christians; the remainder are Turks.

KASCHAU, an ancient royal free town, and capital of the cis-Tisian county of Abauj, Hungary, is pleasantly situated on the right bank of the Hernád, in a valley surrounded by sloping vineyards, about 130 miles northeast from Budapest, with which city, as also with Cracow, Lomberg, and other centers, it is connected by railway. The population of Kaschau in 1900 was 40,102, consisting of Magyars, Germans, Slovaks, and Ruthens. The majority are Roman Catholics.

KASHGAR, or KÁSHGHAR, an important city of eastern Turkestan. It consists of two towns, Kuhna Shahr or "old city," and Yangi Shahr or "new city," about five miles apart, and separated from one another by the Kizil Su, a tributary of the Tarim river. Situated at the junction of routes from the valley of the Oxus, from Khokand and Samarkand, Almati, Aksu, and Khotan, the last two leading from China and India, Kashgar had been noted from very early times as a political and commercial center. Like all other cities of Central Asia, it has changed hands repeatedly, but its greatest modern prominence is probably due to its having formed a few years ago the seat of government of the Amir Yakub Beg, surnamed the Atalik Ghazi, who established and for a brief period ruled with remarkable success a Mohammedan state comprising the chief cities of the Tarim basin from Turfan around along the skirt of the mountains to Khotan. During his rule both Russian and British missions visited Kashgar, and it is chiefly to this circumstance that we are indebted for a full and tolerably recent knowledge thereof. The population of Kashgar at the time the visit of Sir Douglas Forsyth's mission in 1873 was about 112,000. With the overthrow of the Chinese rule in 1865 the manufacturing industries of Kashgar declined, and in the case of some of the profitable arts altogether disappeared. Silk culture and carpet manufacture have flourished for ages at Khotan, and the products always find a ready sale at Kashgar.

KÁSHÍ, the name given to the glazed and colored ornamentation of Mohammedan buildings in parts of Persia and India, and to the art of making it. The work is of two kinds—on clay (bricks or tiles), and on cakes of lime mortar. For surfaces of one color, domes, etc., both kinds are used, differing only in the shape of the tiles or mortar cakes. Figured patterns are differently treated with the different materials. On clay tiles, the designs, with their several colors, are laid on by stenciling, and the tile then glazed. Designs in colored mortar work have each separate piece of color on a separate cake of hardened mortar, cut to the required shape, and these, glazed separately, are afterward cemented together on the walls of the building, or first made up into complete panels, which are then set in their place on the walls. The designs are commonly foliage and flowers, or geometrical figures and interlacing arabesques, and inscriptions in Arabic and Persian characters, and are, many of them, very beautiful.

KASHIN, a district town of Russia, in the government of Tver, 125 miles northeast of the government town, near the Kashinka, a subtributary of the Volga. Population, 8,000.

KÂSHKÂR, also called CHITRÂL, from the residence of the prince, a high-lying Mohammedan state among the spurs of Hindu Kush. The geographical position of Kâshkâr is likely to give it great interest in the future. The ruler of Chitrâl is known both as *Mihtar*, or "Prince," and by the pretentious title of *Bâdshâh*. He has five viziers, of whom the chief, or Dewân-begi, has charge of the king's slave agency, an important part of the reigning system. Under this the rulers of Chitrâl have come to regard the sale of their subjects as a legitimate and ordinary supplement to their revenue. But of late the market has become circumscribed. The population of the kingdom is estimated at 200,000, not including the tributary tribe of Bashgali Kafirs, who occupy a nearly parallel valley on the west, confluent with that of Kâshkâr.

KASHMÍR, or CASHMERE, an elevated and inclosed valley in the Himalaya mountains, north of the Punjab. It is surrounded by lofty hills, with one opening on the west, by which flows out from the valley the river Jhelum. The inclosing hills on the north and east belong to the Bára Lácha chain, and on their outer side is the broad mountainous region which holds the valley of the upper Indus, and which, beyond the Indus, culminates in the great parallel range of Karakorum or Mustágh. On the west and south, the hill boundary, which joins the other half of the inclosure at the southeast end of the valley, is the Panjál or Panchál range, which on its outer side sends down its branches southward through the Jamú territory, to the plains of the Punjab. The length of the Kashmír valley, including the inner slopes of its surrounding hills, is about 120 miles from northwest to southeast. Its greatest width is about seventy-five miles The low and comparatively level floor of the basin is eighty-four miles long and twenty to twenty-four miles broad. Its lowest part is 5,200 feet above the sea, and its mean height 6,000 feet.

This valley is but a small portion, in area, of the dominions of the maharájá of Kashmír, which, in addition to the Jamú territory on the south; include Baltistán and Gilgit on the north, and Kishtwár and Ládák on the east. On the west Kashmír is separated from the valley of Khagán by a continuous range of high hills, and from the British district of Hazára by the river Jhelum.

Jamú, to which Kashmír was annexed in 1846, occupies the southern slopes of the Panjál range, with a strip of plain country at their foot, and extends about 220 miles from east to west, with a greatest direct breadth, north to south, of about seventy-five miles. All the rest of the maharájá's dominions is hill country.

The river Jhelum or Behat—the Hydaspes of Greek historians and geographers—flows northwestward through the middle of the valley.

In the hills of the north boundary are two passes, the Burzil (13,500 feet) and the Kamri (13,200). By the former is a direct route between Srínagar and Iskardo. It is usually practicable only between July 15th and September 15th. The road from Srínagar to Lé in Ládák goes by the Zójí-lá Pass (11,300 feet), near the northeast corner of the valley. Only a short piece of the road, where snow accumulates, prevents this pass being used all the year. At the southeast end of the valley are three passes, the Murgil (11,600 feet), the Hoksar (13,315), and the Murbul (11,550), all leading over to the valleys of the Chenáb and the Rávi. South of Islámábád, on the direct route to Jamú and Siálkót, is the Banihál Pass (9,200 feet). Further west on the Panjál range is the Pír Panjál or Panchál Pass (11,400 feet), with a second pass, the Rattan Pír (8,200 feet).

The valley of Kashmír, sheltered from the southwest monsoon by the Panjál range, has not the periodical rains of India. For all crops except rice, which is irrigated, the rain is ordinarily sufficient. Barley, sown in November, ripens in June; wheat in July. Rice, sown in May and June, ripens in October. Millet, maize, and buckwheat, also turnips, peas, and mustard, are grown in considerable quantity.

There is no natural forest in the level parts of the valley. Of the cultivated trees the finest is the plane (*chinár*), which grows to a large size, and is of great beauty. The principal other trees of the valley are the poplar, willow, cypress, walnut, apple, pear, quince, apricot, cherry, mulberry. Vines are grown extensively, commonly trained up poplar trees. There are many kinds of grape. Much has been said and written about the beauty of the vale of Kashmír. Spring encircles a fresh, green, smiling valley with a noble belt of glistening snow-capped ridges; autumn fills the eye with the wonderful richness of the many-colored foliage. At all times flows on the quiet glassy river, showing back the groves and avenues upon its banks, the strange, tall, shadowy wooden houses, and the craggy hills. There is no place or season which has not something to show of real beauty. The rapturous praises of Mohammedan writers may be often extravagant; and it is with some of their materials, reproduced with more modern additions, that Moore has built up great part of his romance; still few will really think that here extravagance and fiction have left truth much too far behind.

The Kashmír valley has a large number of old buildings of the Hindu period, interesting from their style, which is peculiar to Kashmír, and from the traces which many of them bear of Greek art. The temple of the sun at Marttand or Matan has been one of the finest. Srínagar, the capital, said to have been founded by Pravara Sén, in the beginning of the sixth century, is built on both banks of the Jhelum. The people of Kashmír are now mostly Mohammedan. Physically of fine form, a large proportion of the town-people are enfeebled by poverty and sedentary occupation in close rooms. A few years ago the shawl-weavers of Srínagar were reckoned to be about 22 per cent. of the inhabitants. The proportion is now less, owing to the reduced demand for Kashmír shawls, both loom-made and hand-sewn. The maharájá has endeavored to meet the depression of the shawl trade by extension of silk manufactures; silk is successfully worked, and well dyed. The chief demand for shawls has generally been from France, and French patterns have somewhat interfered with native art. The people of the country, with more healthful occupations and surroundings than those of the towns, especially Srínagar, are robust and of active habits. The Kashmírís, both men and women, wear commonly a kind of loose gown with sleeves, called *phéran* ("a robe"). In cold weather they are in the habit of carrying, under this loose dress, a small portable brazier with heated charcoal. The country people and boatmen use a more close-fitting costume.

According to a report prepared by order of the maharájá in 1873, the population of the valley at that time was nearly 492,000. Of these about 64,000 were Hindus and the rest Moslems, about 4 per cent. of the latter being Shiites. The estimated population of Jamú and Kashmir in 1891 was 2,543,052; in 1901 it was 2,906,173; its area is 80,000 square miles. A great diminution, caused by deaths and emigration, has followed the famine of 1878. It was said that the towns of Islámábád and Sopúr lost nearly two-thirds of their inhabitants. The rice crop of 1879 was abundant, and the rains of the next year seasonable and plentiful. The shawl-weaving and carpet-making trades revived in 1880, and numbers of people who had left the country during the famine returned.

The language of Kashmír (which is spoken only in the valley itself, and in the few outlying settlements of Cashmírís in the neighboring hills and in northern India), is of the Aryan family.

KÁSIMBÁZÁR, or COSSIMBAZAR, a decayed town in Murshidábá district, Bengal.

KASIMOFF, a town of Russia, in the Ryazan government, ninety miles east-northeast of the government town, on the left bank of the Oka, a tributary to the Volga. Population, 13,000.

KASSA. See KASCHAU.

KASTAMUNI, sometimes COSTAMBONE, the chief town of a Turkish vilayet of the same name in Asia Minor, is situated on the Gök Irmak, about 250 miles east of Constantinople. Estimated population, 40,000.

KASTORIA, a town of European Turkey, in the vilayet of Monastir and sandjak of Prisrend, about thirty-three miles south of Monastir (Bitolia), on the western banks of a lake (six miles long and four broad), which drains into the Indjeh, Karasu, or Bistritza. Population, 8,000.

KATER, HENRY (1777–1835), a distinguished physicist of remarkable experimental skill, was born at Bristol, England, and died in London.

KÁTHIÁWÁR, or KATTYWAR, also SURÁSHTRA, a peninsula forming a collection of native States in Guzerat, western India. It is bounded on the north by the Runn or Gulf of Cutch, on the east by Ahmedábád district and the Gulf of Cambay, and on the south and west by the Arabian Sea; the extreme length is 220 miles, the greatest breadth about 165 miles, the area about 22,000 square miles, and the estimated population 2,500,000.

KATÍF, or EL KATIF, a town of Arabia, in the maritime region which skirts the northern part of the Persian Gulf, on the low muddy shore of the northmost of the secondary bays that break the outline of the Bay of Bahrein. Town and district are sometimes considered as part of El Hasa, sometimes as an independent province. The population of the town and district is given as from 90,000 to 100,000.

KATSENA, KASSINA, or KASHNA, a town of Central Africa, situated about 170 miles to the east of Sokoto, the capital of the State, to which it now pays tribute. The walls have a circuit of between thirteen and fourteen English miles, but at the time of Barth's visit only the northwestern quarter was inhabited, and he estimated the population at not more than 7,000 or 8,000. In the seventeenth or eighteenth centuries it appears to have been the largest town in the whole region, and its inhabitants cannot have numbered less than 100,000.

KATTOWITZ, chief town of a circle in the government district of Oppeln and province of Silesia, Prussia, is situated on the Rawa, in a busy mining and manufacturing region near the Polish border. Population about 14,000.

KATAWÁ, or Cutwa, a town in the Bardwán district, Bengal, India, situated at the confluence of the Bhágirathi and Ajái rivers. Population about 9,000.

KAUFBEUREN, an ancient town in the government district of Swabia and Neuburg, Bavaria, is situated on the Wertach, about fifty-five miles southwest of Munich by rail. Population, 6,000.

KAUFFMAN, or Kauffmann, Angelica. This once popular artist and Royal Academician was born at Coire in the Grisons, October 30, 1740 or 1741. In 1754 her father took her to Milan, where she diligently studied the great masters. Later visits to Italy of long duration appear to have succeeded this excursion, and in 1763 she visited Rome, returning to it again in 1764. From Rome she passed to Bologna and Venice. While at Venice, she was induced by Lady Wentworth, the wife of the English ambassador, to accompany her to London, where she appeared in 1765. One of her first works was a portrait of Garrick, exhibited in the year of her arrival at "Mr. Moreing's great room in Maiden Lane."

Her firmest friend was Reynolds. In his pocket-book her name as "Miss Angelica" or "Miss Angel" appears frequently, and in 1766 he painted her, a compliment which she returned by the *Portrait of Sir Joshua Reynolds, ætat. 46*, which was exhibited by Lord Morley at the "Old Masters" in 1876. In its first catalogue of 1769 she appears with "R.A." after her name (an honor which she shared with another lady and compatriot, Mary Moser); and she contributed the *Interview of Hector and Andromache*, and three other classical compositions. From this time until 1782 she was an annual exhibitor, sending sometimes as many as seven pictures, generally classic or allegorical subjects. One of the most notable of her performances was the *Leonardo expiring in the Arms of Francis the First*, which belongs to the year 1778. In 1773 she was appointed by the Academy with others to decorate St. Paul's, and it was she who, with Biaggio Rebecca, painted the Academy's old lecture-room at Somerset House. She retired to Rome, where she lived for twenty-five years with much of her old prestige. In 1782 she lost her father; and in 1795—the year in which she painted the picture of Lady Hamilton, now at South Kensington—her husband (Antonio Zucchi, a Venetian artist). She continued at intervals to contribute to the Academy, her last exhibit being in 1797. After this she produced but little, and in November, 1807, she died, being honored by a splendid funeral under the direction of Canova.

KAULBACH, Wilhelm von, an acknowledged leader in modern art, was born in Westphalia, October 15, 1805. His parentage was humble, and his father, who was poor, combined painting with the goldsmith's trade, but means were found to place Wilhelm, a youth of seventeen, in the art academy of Düsseldorf, then reorganized, and becoming renowned under the directorship of Peter von Cornelius. Kaulbach took up his permanent residence in Munich, labored hard on the public works, executed independent commissions, and rose to such distinction that in 1849, when Cornelius left for Berlin, he succeeded to the directorship of the academy, an office which he held for a quarter of a century, up to the day of his death, in 1874.

KAUNITZ, Wenzel Anton, count of Rietberg, Austrian statesman, was born at Vienna, February 2, 1711. He was sent by Maria Theresa on embassies to Rome and Florence, and was engaged at Turin in strengthening the alliance between Austria, Sardinia, and Great Britain against the Bourbons. In 1744 he was sent as minister to the court of the duke of Lorraine, governor-general of the Austrian Netherlands. During the duke's absence, Kaunitz administered affairs ably; and, when the French besieged Brussels in 1746, he secured a free retreat for the Austrian troops to Antwerp. After a brief retirement on account of his health, Kaunitz reappeared on the political stage at the congress of Aix-la-Chapelle in 1748, where he laid the foundation of his reputation, and earned the rank of minister of state. During his stay as ambassador at Paris, from 1750 to 1752, he concluded a secret alliance between Austria and France. In 1756 he was made chancellor of the Netherlands and of Italy. For nearly forty years he continued in this capacity to direct the affairs of Austria, steadily cultivating the French and Russian alliances, and jealously watching the rising power of Prussia, against which he formed the coalition of 1756. Under Joseph II. and Leopold II. his influence waned, and he resigned all his offices at the accession of Francis II. in 1792 In 1764 he was created a prince of the empire. He died June 27, 1794.

KAVA, an intoxicating drink used in the islands of the South Pacific from the Sandwich Islands to Fiji. In Hawaii it is called "kawa;" in the Marquesas "kava kava;" "ava-ava," and "evava" in Tahiti; and in Fiji "yaquona." It is made from the roots or leaves of a species of pepper indigenous in these islands; several varieties are also cultivated by the natives, those growing in a dry soil being considered to be the most active.

KAVALA, or Cavallo, a walled town of European Turkey in the vilayet of Saloniki, situated on a promontory stretching southward into the bay of Kavala, opposite the island of Thaso. Numerous Roman remains have been found in the neighborhood, of which the chief is the large aqueduct on two tiers of arches, which still serves to supply the town and dilapidated citadel with water from Mount Pangeus. Population about 5,000.

KAVANAGH, Julia (1824–1877), novelist, was born at Thurles in Tipperary, Ireland. Julia Kavanagh's first book was *Three Paths*, 1847, a story for the young; but her first work to attract notice was *Madeleine, a tale of Auvergne*, 1848. *A Summer and Winter in the Two Sicilies*, 2 vols., 1858, was the fruit of a journey made about 1853 to France, Switzerland, and Italy. *French Women of Letters*, 2 vols., 1862, and *English Women of Letters*, 2 vols., 1863, are collections of slight biographical essays on lady novelists. She wrote also *Woman in France during the Eighteenth Century*, 2 vols., 1850, and *Women of Christianity*, 1852. But Miss Kavanahg is better known by her numerous novels and tales contributed to various magazines.

KÁVERI, or Cauvery, a great river of southern India, famous for its traditional sanctity, its picturesque scenery, and its utility for irrigation. Rising in Coorg, high up amid the Western Gháts, it flows with a generally southeastern direction across the plateau of Mysore, and finally pours itself into the Bay of Bengal through two principal mouths in Tanjore district. Its total length is about 475 miles; the estimated area of its basin, 28,000 square miles.

KAY, JOHN (1742–1826), Scottish caricaturist, was born in Dalkeith, Scotland.

KAYE, SIR JOHN WILLIAM, historian, was born in 1814, the son of a solicitor. Educated at Eton and Addiscombe Royal Military College, he served as an officer in the Bengal artillery till 1841, when he exchanged his sword for the pen. In 1856 he entered the service of the East India Company in England; and, when next year the crown assumed the government of India, Kaye succeeded John Stuart Mill as secretary in the political and secret department of the India office. He died in 1876.

KAZALA, or **KAZALINSK**, a fort and town, at the point where the Kazala falls into the Jaxartes, about forty-seven miles from its mouth.

KAZAN, a government of European Russia, belonging to the basin of the Volga, and conterminous with the governments of Nizhni Novgorod, Vyatka, Orenburg, Samara, and Simbirsk. The area is 24,601 square miles; the population (1898), 2,191,058. The Volga is navigable in all the 198 miles of its course through Kazan, as well as the Kama (120 miles).

KAZAN, chief town of the above government, is situated 528 miles east of Moscow, and 970 miles from St. Petersburg. Population, 132,000.

KAZINCZY, FERENCZ or **FRANCIS** (1759–1831), an Hungarian author, known as the most indefatigable agent in the regeneration of the Maygar language and literature at the end of the eighteenth and beginning of the nineteenth century, was born at Ér-Semlyén, in the county of Bihar, Hungary.

KEAN, CHARLES JOHN, tragedian, son of Edmund Kean noticed below, was born at Waterford, Ireland, January 18, 1811. In his fourteenth year he was sent to Eton College, where he remained three years. The name of Kean secured him an engagement at Drury Lane Theater, where he made his début October 1, 1827, in the character of "Norval." After a visit to America in 1830, where he was received with much favor, he in 1833 appeared at Covent Garden as "Sir Edmund Mortimer." In January, 1838, he returned to Drury Lane, and played "Hamlet," with a success which gave him a place among the principal tragedians of his time. After his marriage with the actress Miss Ellen Tree, in 1842, he paid a second visit to America. Returning to England in 1847, he entered on a successful engagement at the Haymarket, and in 1850, along with Mr. Kelly, he became lessee of the Princess Theater. The most noteworthy feature of his management was a series of gorgeous Shakespearean revivals. In melodramatic parts such as "Louis XI." and the "Corsican Brothers" his success was unequivocal and complete. From his "tour round the world" Kean returned in 1866 in broken health, and he died at London, January 22, 1868.

KEAN, EDMUND, an English actor, chiefly celebrated as the impersonator of Shakespearean characters, was born at Chancery Lane, London, November 4, 1787. His reputed father was Aaron Kean, stage carpenter, and his mother was a strolling actress, Ann Carey, granddaughter of Henry Carey, the author of the *National Anthem*, and natural son of George Savile, marquis of Halifax. When only in his fourth year Kean made his first appearance on the stage as "Cupid" in one of Noverre's ballets at the opera-house. In his fourteenth year he obtained an engagement to play leading characters for twenty nights in York Theater, appearing as "Hamlet," "Hastings," and "Cato." Shortly afterward, while he was in the strolling troupe of Richardson, the rumor of his abilities reached the ear of King George III., who commanded him to recite at Windsor Castle. In 1807 he played leading parts in the Belfast theater along with Mrs. Siddons, who said that he "played very, very well," but that "there was too little of him to make a great actor." An engagement in 1808 to play leading characters in Beverley's provincial troupe was brought to an abrupt close by his marriage with Miss Chambers, the leading actress, and for several years after his prospects were so dark that, when contemplating the possibility of a début in London, he was in the habit of exclaiming, "If I succeed I shall go mad." In 1814, however, the committee of Drury Lane theater, the fortunes of which were then so low that bankruptcy seemed inevitable, resolved to give him a chance among the "experiments" they were making to win a return of popularity. His début there on January 26th, as "Shylock," roused the audience to almost uncontrollable enthusiasm, and successive appearances in "Richard III.," "Hamlet," "Othello," "Macbeth," and "Lear," only served to demonstrate to the fullest the greatness of his powers and his complete mastery of the whole range of tragic emotion.

Probably the irregular habits of Kean, even from the period when he became famous, were prejudicial to the refinement of his taste, and latterly they tended to exaggerate his special defects and mannerisms. His last appearance on the stage was at Covent Garden, on March 25, 1833, when he played "Othello" to his son's "Iago." At the words "Villain, be sure," in scene third of act third, he suddenly broke down, and fell insensible into his son's arms. He died at Richmond, May 15, 1833.

KEARNEY, a thriving city of Buffalo county, Neb., situated on the Platte river, 195 miles southwest of Omaha, and at the junction of several important railroads. It has several banks, a number of churches and good schools, and is the seat of a growing trade. Population (1900), 5,634.

KEATS, JOHN, born October 29, 1795, published his first volume of verse in 1817, his second in the following year, his third in 1820, and died of consumption at Rome, February 23, 1821, in the fourth month of his twenty-sixth year. In his first book there was little foretaste of anything greatly or even genuinely good; but between the marshy and sandy flats of sterile or futile verse there were undoubtedly some few purple patches of floral promise. The style was frequently detestable—a mixture of sham Spenserian and mock Wordsworthian, alternately florid and arid. His second book, *Endymion*, rises in its best passages to the highest level of Barnfield and of Lodge, the two previous poets with whom, had he published nothing more, he might most properly have been classed; and this, among minor minstrels, is no unenviable place. His third book raised him at once to a foremost rank in the highest class of English poets. Never was any one of them but Shelley so little of a marvelous boy and so suddenly revealed as a marvelous man.

Keats, on high and recent authority, has been promoted to a place beside Shakespeare; and it was long since remarked by some earlier critic of less note that as a painter of flowers his touch had almost a Shakespearean felicity. The faultless force and profound subtlety of this deep and cunning instinct for the absolute expression of natural beauty can hardly be questioned or overlooked; and this is doubtless the one main distinctive gift or power which denotes him as a poet among all his equals, and gives him right to a rank forever beside Coleridge and Shelley.

Keats was born, as already stated, in London, on October 29, 1795. At an early age he was sent to school at Enfield, and in 1810 he was apprenticed to a surgeon at Edmonton. On the completion of his apprenticeship in 1815, he removed to London for the purpose of walking the hospitals, and soon made the acquaintance of Leigh Hunt, and subsequently that of Haydon, Hazlitt, Shelley and others. After having published some sonnets in the *Examiner*, of which Hunt was at that time editor, he was encouraged by the praise of his friends to give to the world a volume of *Poems* in 1817, and a second, entitled *Endymion, a Poetic Romance*, in the following year. Meanwhile, symptoms of hereditary lung disease having shown themselves, he spent some months in visiting the English lake district and portions of Scotland and Ireland, but without reëstablishing his failing health; on his return to London the despondency which had fallen upon him on this account was deepened by the death of his younger brother. Soon after this event he first became acquainted with Miss Brawne, and the friendship rapidly grew into a passion, which combined with straitened circumstances and the steady progress of disease to give a tragical cast to all that remained of his brief career. In 1820 the results of his literary activity during the two preceding years were published in *Lamia, Isabella, the Eve of St. Agnes, and other Poems*. In autumn of the same year, having been advised to winter in a more genial climate, he sailed for Italy. The voyage proved of little advantage, and, after some months of suffering, he died at Rome on February 23, 1821. *The Life, Letters, and Literary Remains* of Keats were published in two volumes by R. Monckton Milnes in 1848. *The Letters of John Keats to Fanny Brawne*, with introduction and notes by Harry Buxton Forman, appeared in 1878.

KEBLE, JOHN, the poet of the *Christian Year*, was born on April 25, 1792, at Fairford, Gloucestershire. John was elected scholar of Corpus in his fifteenth, and fellow of Oriel in his nineteenth year, April, 1811. In Easter term, 1810, he had obtained double first class honors, a distinction which had been obtained only once before, and that by Sir Robert Peel. After his election to the Oriel fellowship, Keble gained the University prizes, both for the English essay and also for the Latin essay. Oriel College was, at the time when Keble entered it, the center of all the finest ability in Oxford. Copleston, Davison, Whately, were among the fellows who elected Keble; Arnold, Pusey, Newman, were soon after added to the society. In 1815 Keble was ordained deacon, and priest in 1816. His real bent and choice were toward a pastoral cure in a country parish; but he remained in Oxford, acting first as public examiner in the schools, then as tutor in Oriel, till 1823. In summer he sometimes took clerical work, sometimes made tours on foot through various English counties, during which he was composing poems, which afterward took their place in the *Christian Year*. In 1823 he left Oxford, and returned to Fairford, there to assist his father, and with his brother to serve one or two small and poorly endowed curacies in the neighborhood of Coln. He had made a quiet but deep impression on all who came within his influence in Oxford, and during his five years of college tutorship had won the affection of his pupils, some of whom afterward rose to eminence. It was in 1827, a few years after he settled at Fairford, that he published the *Christian Year*. Probably no book of poetry in this century has had a wider circulation. Between 1827 and 1872 158 editions had issued from the press, and since the latter date it has been largely reprinted both by the original publishers and by others.

Toward the close of 1831 Keble was elected to fill the chair of the poetry professorship in Oxford, as successor to his friend and admirer, Dean Milman. This chair he occupied for ten years, probably the most eventful ten years which Oxford has seen since the Reformation.

To the *Tracts for the Times*, which did so much to spread High Church views, Keble made only four contributions:—No. 4, containing an argument, in the manner of Bishop Butler, to show that adherence to apostolical succession is the safest course; No. 13, which explains the principle on which the Sunday lessons in the church service are selected; No. 40, on marriage with one who is unbaptized; No. 89, on the mysticism attributed to the early fathers of the church.

In 1841 the tracts were brought to an abrupt termination by the publication of Newman's tract No. 90. All the Protestantism of England was in arms against the author of the obnoxious tract. Keble came forward at the time, desirous to share the responsibility and the blame, if there was any; for he had seen the tract before it was published, and approved of it. The same year in which burst this ecclesiastical storm saw the close of Keble's tenure of the professorship of poetry, and thenceforward he was seen but rarely in Oxford. No other public event ever affected Keble so deeply as the secession of his friend, Mr. Newman, to the Church of Rome in 1845. He died March 29, 1866.

KECSKEMÉT (Lat. *Egopolis*), a royal free town in the county of Pest-Pilis-Solt-Kis-Kun, Hungary, is situated in an extensive plain, on the railway between Szeged (Szegedin) and Budapest, fifty-two miles southeast of the latter. The population in 1900 was 57,812, chiefly Magyars by nationality.

KEELING ISLANDS, or COCOS ISLANDS, also called by Horsburgh the Borneo Coral Islands, a group in the Indian Ocean, about 600 miles south of the coast of Sumatra.

KEEF, more correctly El-Keff (El Kaf), a town of the regency of Tunis, about ninety-five miles southwest from the capital, and seventy-five miles southeast of Bône in Algeria, on the western declivities of a rocky range of bold hills, five or six miles to the east of the course of the Wady Medjardak Population, 12,000.

KEENE, the capital of Cheshire county, N. H., is situated on the Ashuelot river, ninety-two miles northwest of Boston. It is a handsome city, and has considerable manufactures of leather, pottery, woolen goods, and furniture. Two newspapers are published here, and the city contains four national and two savings banks, and has a population (1900) of 9,165.

KEIGHLEY, locally Keithley, anciently Keigheley, a market and manufacturing town in the northern division of the West Riding of Yorkshire, England, is situated in a deep valley near the junction of the Worth with the Aire. By the Midland Railway it is ninety-five miles southeast of Carlisle and 222 north of London. The population is 30,000.

KEI ISLANDS, a group in the East Indian archipelago, consisting of one large and several smaller islands, some ninety miles to the south of the western end of New Guinea, and between the southern Moluccas and the Aru islands The inhabitants are supposed to number 18,000 or 20,000.

KEIM, THEODOR (1825–1878), a prominent German theologian of the "mediation" school, was born at Stuttgart. From 1860 to 1873 he held the office of professor ordinarius in Zürich, and from 1873 until shortly before his death, in November, 1878, has occupied a similar post at Giessen.

KEITH, an old Scotch family which takes its name from the barony of Keith in East Lothian, bestowed, it is said, by Malcolm II. on a member of the house along with the office of hereditary grand marischal in reward for bravery shown in a battle against the Danes. The estates of the Keiths were forfeited on account of the part taken by George Keith, tenth earl, and his brother Francis (see next article) in the rebellion of 1715. Through the influence of his brother with Frederick the Great, the earl became governor of Neufchatel. After the reversal of the attainder he returned to Scotland, but soon made his way back to Berlin, where he died in April, 1788. Through his death without issue the male line of the house became extinct.

KEITH, FRANCIS EDWARD JAMES, generally known as Marshal Keith, son of William, the ninth earl marischal (see last article), was the most notable member of the house of Keith. The rebellion of 1715, in which he displayed qualities that gave some augury of his future eminence, compelled him to seek safety on the Continent. After spending two years in Paris, chiefly in studying at the university, he in 1719 took part in the ill-starred expedition of the Pretender to the Highlands of Scotland. He then passed some time at Paris and Madrid in obscurity and poverty, until he obtained the pay of a colonel from the king of Spain. Finding his Protestantism a barrier to promotion, he obtained from the king of Spain a recommendation to the emperor Peter II. of Russia, from whom he received the command of a regiment of the guards. In several Russian campaigns the calm, intelligent, and watchful valor which was his chief characteristic was displayed to such advantage that he obtained the rank of general and the reputation of being one of the ablest officers in the Russian service. He was killed, October 14, 1758, at the battle of Hochkirch.

KEJ, the capital of the province of Mekran (the Gedrosia of the Greeks) in Baluchistan. There exists really no town, but a number of small villages dominated by a fort built upon a rock, on the eastern bank of the Kej river.

KELAT. See KHELAT.

KELLERMANN, FRANÇOIS CHRISTOPHE, duke of Valmy and marshal of France, was born near Rothenburg, in Bavaria, in May, 1735. He entered the French army as a volunteer, and served in the Seven Years' War and in Louis XV.'s Polish expedition of 1771. By 1785 he had attained the rank of maréchal-de-camp. In 1789 Kellermann enthusiastically embraced the cause of the Revolution, and in 1791 he became general of the army in Alsace. In August, 1792, he received command of the army of the center, with orders to effect a junction with Dumouriez in Champagne. The day after he had succeeded in this operation (September 20), he was forced to give battle to the allies on the heights of Valmy. General Kellermann led his troops to a decisive victory. Transferred next to the army on the Moselle, Kellermann was accused by General Custine of neglecting to support his operations on the Rhine; but from this, as from a similar charge in 1793, he was acquitted at the bar of the Convention in Paris, and was placed at the head of the army of the Alps and of Italy. Shortly afterward he received instructions to reduce Lyons, then in open revolt against the Convention. The hesitation he displayed in executing that order brought him again into suspicion; and he was imprisoned in Paris for thirteen months. Once more honorably acquitted, he was reinstated in his command, and did good service in maintaining the southeastern border against the Austrians. When Napoleon came to power Kellermann was named successively senator, marshal of France, and duke of Valmy. In 1814 he voted for the deposition of the emperor, and became a peer under the royal government. After the "Hundred Days" he sat in the high chamber and voted with the Liberals. He died September 12, 1820.

KELLGREN, JOHAN HENRIK (1751–95), Swedish poet and critic, was born at Floby in West Gothland.

KELLS, a market and municipal town of Meath county, Ireland, is situated on the Blackwater and on the Dublin and Meath Railway, thirty-nine miles northwest of Dublin. Population, 2,820.

KELP (Fr. *varech*) is produced by the incineration of various kinds of seaweed (*Algæ*) obtainable in great abundance on the west coasts of Ireland and Scotland, and the coast of Brittany, in France. It is prepared from the deep-sea tangle, sugar wrack, knobbed wrack, black wrack, and bladder wrack. The Laminarias yield what is termed driftweed kelp, obtainable only when cast up on the coasts by storms or other causes. The species of *Fucus*, on the other hand, growing within the tidal range, are cut from the rocks at low water, and are therefore known as cut-weeds. In the preparation of kelp the weeds are first dried in the sun, and are then collected into shallow pits on the ground and burned till they form a fused mass, which, while still hot, is sprinkled with water in order to break it up into convenient pieces. A ton of kelp is obtained from twenty to twenty-two tons of wet seaweed.

KELSO, a burgh of barony and market-town of Roxburghshire, Scotland, is situated on the north side of the Tweed, near its junction with the Teviot, forty-five miles southeast of Edinburgh and twenty-three southwest of Berwick by rail. Population, 5,000.

KEMBLE, CHARLES, a younger brother of John Philip Kemble, noticed below, was born at Brecknock, South Wales, November 25, 1775. Like his brother he was educated at Douai. After returning to England in 1792, he obtained a situation in the postoffice, but this he soon resigned for the stage, making his début at Sheffield as "Orlando" in *As You Like It*. During the early period of his career as an actor, chiefly on account of the great abilities of his sister and brother, he made his way only slowly to public favor. For a considerable time he played along with them, chiefly in secondary parts, and this with a grace and finish which received scant justice from the critics. Ultimately he won independent fame. The latter period of his career was clouded by money embarrassments in connection with his joint proprietorship in Covent Garden Theater. He formally retired from the stage in December, 1836, but his final appearance was on April 10, 1840. For some time he held the office of examiner of plays. He died November 12, 1854.

KEMBLE, JOHN MITCHELL, Anglo-Saxon scholar and historian, eldest son of Charles Kemble, noticed above, was born in 1807. At school he was distinguished for his miscellaneous knowledge, and at the university his essays on historical subjects gained him high reputation. The historical bent of his studies was confirmed and turned more especially toward the Anglo-Saxon period through the influence of the brothers Grimm, under whom he studied at Göttingen. He was for some time editor of the *Foreign Quarterly Review*. In 1857 he published *State Papers and Correspondence illustrative of the Social and Political State of Europe from the Revolution to the Accession of the House of Hanover*. He died at Dublin, March 26, 1857.

KEMBLE, JOHN PHILIP, tragedian, was the second child of Roger Kemble, a strolling player, and his wife, Sarah Ward, the eldest child being Sarah, known as Mrs. Siddons. He was born at Prescot, Lancashire, February 1, 1757. In his eleventh year he became an inmate of Sedgely Park Catholic seminary, near Wolverhampton, and, after remaining there four years, entered the college of Douai with the view of becoming a priest. At the conclusion of the course, however, he discovered that he had no vocation for the priesthood, and, arriving in England in the end of 1775, he joined the theatrical company of Crump and Chamberlain, his first appearance being in the character of "Theodosius" at Wolverhampton, January 8, 1776. Various stories, more or less apocryphal, are told of his early hardships, until, in 1778, he joined the York company of Wilkinson, where he appeared in "Hamlet" and other leading parts, besides contributing a drama of his own on the subject of Belisarius. In 1781 he made a decided step in advance, obtaining a "star" engagement in Smock Alley Theater, Dublin, and achieved astonishing success in the *Count of Narbonne*, by Captain Jephson. Gradually he won for himself a high reputation as a careful and finished actor, and this, combined with the greater fame of his sister, Mrs. Siddons, led to an engagement in Drury Lane Theater, where he made his début, September 30, 1783, in the part of "Hamlet." His appearance was successful, but rather by awakening interest and discussion than enthusiastic approval. His first decided success was in the character of "Macbeth," when he shared in the enthusiasm aroused by Mrs. Siddons, and established for himself a reputation among living actors second to hers only. In December, 1787, he married Mrs. Brereton, the widow of a young actor. His appointment as manager of the theater in October of the following year gave him full opportunity to experiment with whatever parts might strike his fancy, and of this he took advantage with greater courage than discretion. Kemble took his final leave of the stage in the part of "Coriolanus," June 23, 1817, his retirement being probably hastened by the increasing popularity of Kean. The remaining years of his life were spent chiefly abroad, first at Toulouse, and, after a short stay in London, at Lausanne, where he died, February 20, 1823.

KEMPIS, THOMAS À, is the name by which Thomas Hammerken (Hammerchen, Malleolus) is commonly known. He was born in 1379 or 1380, in the town of Kempen. Florentius told him that a monk's life would suit him best, advised him to join the Augustinian order, and sent him to Zwolle to the new convent of Mount St. Agnes, where his brother John was prior. Thomas was received there in 1399, he professed the vows in 1407, received priest's orders in 1413, became sub-prior in 1425, and died on August 8, 1471, being ninety-one years old.

Did Thomas à Kempis write the *Imitation of Christ?* Had it not been for his connection with this famous little book, Thomas would have been no better known than Gerhard Groot, Florentius Radewyn, or Jan van Ruysbroeck. The problem of authorship has given rise to the most interminable controversy the history of literature has ever seen, and one which seems to be still as fresh as it was in the seventeenth century.

Thomas à Kempis is acknowledged to be the author by most of the earliest dated MSS., by most of the earliest printed editions of the book, by a great mass of contemporary evidence, and by a great deal of internal evidence, some of a most interesting kind.

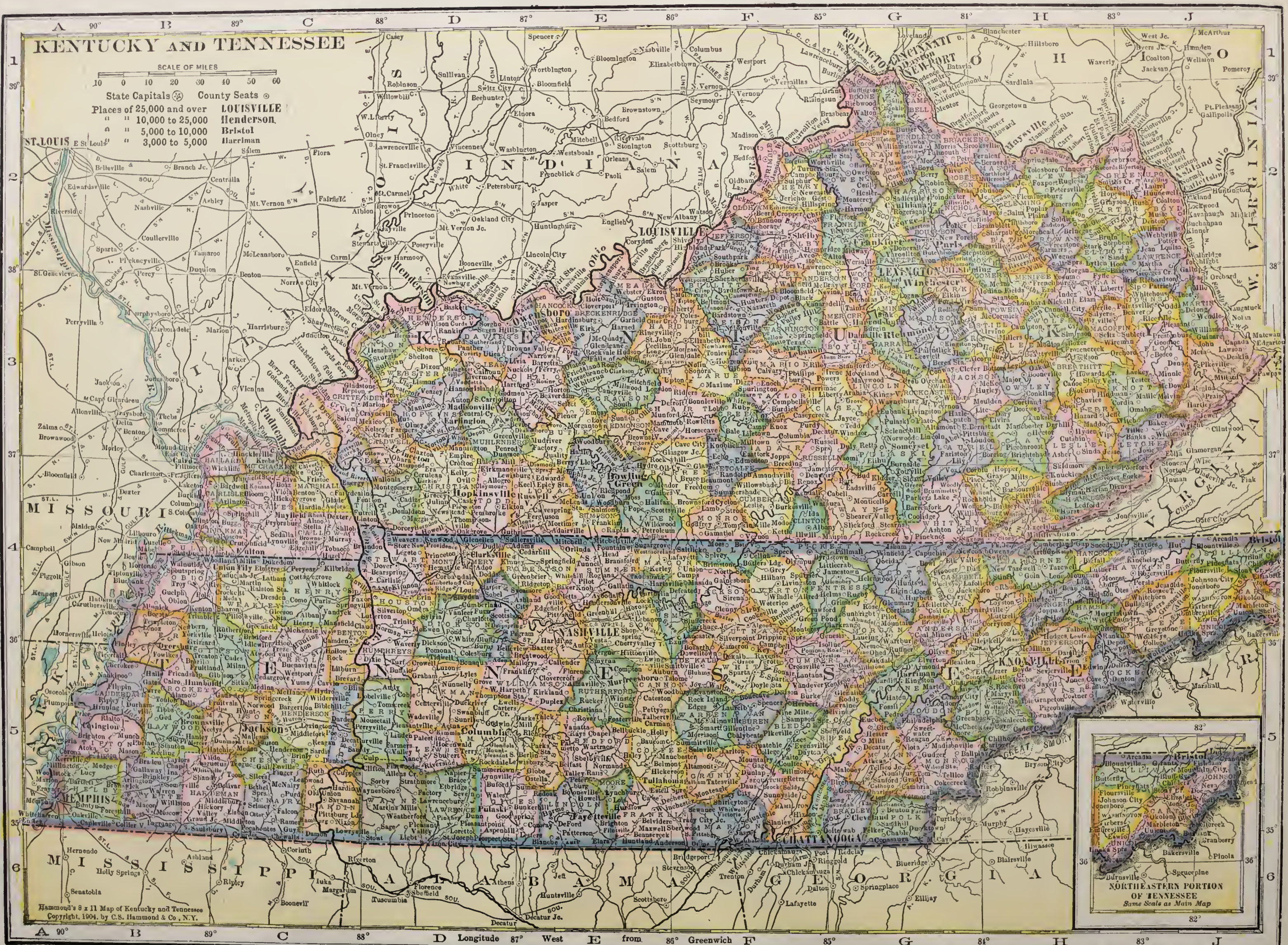
The *Imitatio Christi* is commonly classed among the mystical writings of the fifteenth century, and in the opinion of writers of the most opposite schools of thought it sums up all that is best of that side of Latin Christianity which includes the theology of the Victorines, of Bernard and Bonaventura, of Eckhart, Tauler, and Ruysbroeck.

KEMPTEN, a town in the government district of Swabia and Neuburg, Bavaria, is situated on the Iller, about sixty-five miles southwest of Munich. Population about 16,000.

KEN, THOMAS, the most eminent of the non-juring bishops, and one of the fathers of modern English hymnology, was born at Little Berkhampstead, Herts, in 1637. In 1652 he entered Winchester College, and in 1656 became a student of Hart Hall, Oxford. He gained a fellowship at New College in 1657, and proceeded B.A. in 1661, and M.A. in 1664. Ordained in 1662, when he was twenty-five years old, he successively held the livings of Little Easton in Essex, Brighstone (sometimes called Brixton) in the Isle of Wight, and East Woodhay, in Hampshire; in 1672 he resigned the last of these, and returned to Winchester, being by this time a prebendary of the cathedral, and chaplain to the bishop, as well as a fellow of Winchester College. He remained there for several years, acting as curate in one of the lowest districts, and fulfilling other duties in the city, and preparing his *Manual of Prayers for the Use of the Scholars of Winchester College*, which was first published in 1674. It was at this time that he wrote, primarily for the same body as his prayers, his morning, evening, and midnight hymns, the first two of which, beginning, "Awake, my soul, and with the sun," and "Glory to Thee, my God, this night," are now household words wherever the English tongue is spoken. In 1679 he was appointed by Charles II. chaplain to the Princess Mary, wife of William of Orange. In 1684, upon a vacancy occurring in the see of Bath and Wells, Ken, now Doctor Ken, was appointed bishop. The consecration took place at Lambeth, January 25, 1685, and one of Ken's first duties was to attend the death-bed of Charles, where his wise and faithful ministrations won the admiration of everybody except Bishop Burnet. In this year he published his *Exposition on the Church Catechism*, which is perhaps better known by its sub-title, *The Practice of Divine Love.* His public life as bishop is mainly remembered from the stand he took upon two memorable occasions. In 1688, when James reissued his "Declaration of Indulgence," Ken was one of the "seven bishops" who refused to publish it. Along with his six brethren, Ken was committed to the Tower, June 8, 1688, on a charge of high misdemeanor; the trial, which took place on the 29th and 30th of the month, and which resulted in a verdict of acquittal, is matter of history. With the revolution which speedily followed this impolitic trial, new troubles encountered Ken; for, having sworn allegiance to James, he thought himself thereby precluded from taking the oath to William of Orange. Accordingly, he took his place among the non-jurors, and, as he stood firm to his refusal, he was, in August, 1691, superseded in his bishopric by Doctor Kidder, dean of Peterborough. From this time he lived mostly in retirement, finding a congenial home with Lord Weymouth, his friend from college days, at Longleat, in Somersetshire; and, though pressed to resume his diocese in 1703, upon the death of Bishop Kidder, he declined. He died March 19, 1711.

KENDAL, KIRKBY-KENDAL, or KIRKBY-IN-KENDAL, a market-town and parliamentary and municipal borough of Westmoreland, is picturesquely situated in a pleasant valley on the east bank of the Kent or Ken, forty-four miles south of Carlisle (fifty by rail), and 241 miles from London. The population is 15,696.

KENILWORTH, a small town of Warwickshire, is pleasantly situated on a tributary of the Avon, on the railway from Coventry to Leamington, five miles distant from both towns, and ninety-nine miles north from London. The town is only of importance from its antiquarian interest and the magnificent ruins of its old castle. The old royal residence of the Saxon kings was destroyed in the wars between Edward and Canute. By his grandson Henry de Clinton it was given to King John, and it remained a royal residence until the time of Henry III., who granted it to Simon de Montfort, earl of Leicester. After the battle of Evesham, August 14, 1265, at which Simon de Montfort was slain, the rebel forces rallied at the castle, when it sustained a siege of six months, but finally capitulated to Henry III., who bestowed it on his son Edmund. After being used as the prison of Edward II. previous to his re-



KENTUCKY AND TENNESSEE

SCALE OF MILES

State Capitals ⊛ County Seats ⊙

Places of 25,000 and over		LOUISVILLE
"	" 10,000 to 25,000	Henderson
"	" 5,000 to 10,000	Bristol
"	" 3,000 to 5,000	Harriman

NORTHEASTERN PORTION OF TENNESSEE
Same Scale as Main Map

Hammond's 8 x 11 Map of Kentucky and Tennessee
Copyright, 1904, by C.S. Hammond & Co., N.Y.

Longitude 87° West from 86° Greenwich

moval to Berkeley, it came into the possession of John of Gaunt, by whom it was greatly enlarged. On his son becoming king as Henry IV., it was made a royal residence, and it remained in the possession of the crown until Queen Elizabeth in 1562 granted it to Robert Dudley, earl of Leicester, who spent a large sum in restoring it, and whose splendid entertainments there to Elizabeth are described in Scott's novel of *Kenilworth*. During the civil war it was dismantled by the soldiers of Cromwell, and it was thenceforth abandoned to decay. The walls of the castle originally inclosed an area of seven acres. The principal portions of the building still remaining are the gatehouse, now used as a dwelling-house; Cæsar's tower, the only portion built by Geoffrey de Clinton now extant, with massive walls sixteen feet thick; the Merwyn's tower of the novel of *Kenilworth;* the great hall built by John of Gaunt with windows of very beautiful design; and the Leicester buildings, which are in a very ruinous condition. Not far from the castle are the remains of an Augustinian monastery founded in 1122, and afterward made an abbey.

KENNEDY, Thomas Francis (1788–1879), a distinguished Scottish Liberal politician, was born near Ayr, Scotland. He died in 1879, having attained the almost patriarchal age of ninety-one. He had married in 1820 the only daughter of Sir Samuel Romilly.

KENNET, White (1660–1728), bishop of Peterborough, a theological writer and learned antiquarian, was born at Dover, and died at Westminster.

KENNICOTT, Benjamin (1718–1783), an eminent Hebraist, was born at Totnes, Devonshire, England. In 1767 he was appointed keeper of the Radcliffe library, and made D.D. He was also canon of Christ Church, and rector of Culham in Oxfordshire, and was subsequently presented to the living of Mynhenyote, Cornwall, which, however, being unable to visit it, he resigned two years before his death. He died of a lingering illness at Oxford, on September 18, 1783.

KENOSHA, chief city of Kenosha county, Wis., is situated in a fertile district on Lake Michigan, about thirty miles south of Milwaukee, with which it is connected by rail. It contains numerous schools, and carries on the manufacture of hardware, wooden wares, machines and carriages. There are also in the city breweries, foundries, tanneries, planing-mills, and other industrial establishments. It possesses a good harbor, and carries on trade in its manufactures and in country produce. Population (1900), 11,606.

KENSINGTON, a western suburb of London in the parish of Kensington. Kensington palace, a plain and irregular brick structure, originally surrounded by grounds extending to about 350 acres, was at one time the residence of Lord Chancellor Finch, afterward earl of Nottingham, of whom it was bought by William III. Additions were made to it by William III., George I., George II., and the duke of Sussex. The palace was the birthplace of Queen Victoria.

KENT, a maritime county in the southeastern corner of England, is bounded on the north by the estuary and mouth of the Thames, east and southeast by the English Channel, southwest by Sussex, and west by Surrey. Its greatest breadth north and south from Sheerness to Dungeness is thirty-five miles, its length northwest to southeast from London to Dungeness about sixty miles, and its length west to east from Surrey to North Foreland in Thanet 65 miles. The area is 1,520 square miles; pop. (1901), 936,003. Kent abounds in beautiful and finely-wooded valleys with undulating and picturesque uplands. The valley of the Medway, especially the district around Maidstone, which has been called the garden of England, is the most fertile part of the county, the soil being a deep loam with a subsoil of brick-earth.

KENT, James, American jurist, was born at Philippi, in New York State, July 31, 1763. He graduated at Yale College in 1781, and began to practice law at Poughkeepsie, in 1785. In 1790 and 1792 Kent was chosen to represent Dutchess county in the State legislature. In 1793 he removed to New York, where Governor Jay, to whom the young lawyer's Federalist sympathies were a strong recommendation, appointed him a master in chancery for the city. The year 1796 saw Kent again a member of the legislature and professor of law in Columbia College. In 1797 he became recorder of New York, in 1798 judge of the supreme court of the State, in 1804 chief-justice, and in 1814 chancellor of New York. In 1822 he became a member of the convention to revise the State constitution. Next year, having attained the age of sixty, Chancellor Kent resigned his office, and was reëlected to his former chair. Out of the lectures he now delivered grew the *Commentaries on American Law* (4 vols., 1826–30), which by their learning, range, and lucidity of style, have won for him a high and permanent place in the estimation of jurists. He died in New York, December 12, 1847.

KENT, William (1685–1748), "painter, architect, and the father of modern gardening," as Horace Walpole in his *Anecdotes of Painting* describes him, was born in Yorkshire.

KENTIGERN, St. (*c.* 516–603), popularly known as St. Mungo, the apostle of Strathclyde and the restorer of Christianity among the Cumbrians, was, according to Jocelyn of Furness, the son of "the daughter of a certain king most pagan in his creed who ruled in the northern parts of Britannia." He founded the bishopric of Glasgow.

KENTON, the capital of Hardin county, Ohio, is situated on the Scioto river, fifty-six miles north of Springfield. It has four banks, two newspapers, ten churches, some foundries and machine shops. It possesses railroad and telegraph facilities, and has a population (1900) of 6,852.

KENTUCKY, the fifteenth State admitted into the Union, is bounded on the east by Virginia and West Virginia, on the west by Missouri, on the south by Tennessee and Virginia, and on the north by Ohio, Indiana and Illinois. Its extreme length from east to west is 458 miles, its greatest breadth 191 miles, and its area 37,680 square miles. The surface consists of an elevated plateau sloping from southeast to northwest. The Pine and Cumberland ranges of mountains have an elevation of from 2,000 to 3,500 feet, and the great central undulating plateau of over 10,000 square miles known as the "Blue Grass region," is from 800 to 1,100 feet above sea-level. Kentucky is rich in navigable streams; the Ohio bounds it on the north, the Mississippi on the west, and the Big Sandy on the east. The Licking, Kentucky, Tennessee, and Cumberland, the Green and Tradewater rivers furnish many hundred miles of transport for coal and lumber. The sub-carboniferous limestone formation of the south and west abounds in caverns, the most celebrated of which is the Mammoth Cave (*q.v.*) in Edmonson county.

Agriculture is almost exclusively the occupation of the inhabitants. The magnificent blue-grass pastures are the breeding grounds of thousands of fine horses, and most of the prize-winners of the American turf are natives of this State. Mules of large size and great strength are also bred here.

In 1900, the number of its manufacturing establishments was 9,560, with a total capital of over $104,000,000, and giving employment to 68,000 wage-earners. The value of its products exceeded $154,600,000.

Kentucky is rich in coal, iron-ore, and fire-clay. Timber is abundant and the forest products are very valuable. Oak, hickory, ash, locust, and buckeye are the chief forest trees. The principal crops of Kentucky in 1899, were as follows: —

Crops.	Bushels.	Acres.	Value.
Corn	73,974,220	3,319,257	$29,423,996
Wheat	14,264,500	1,431,027	8,923,760
Oats	4,009,830	316,590	1,247,928
Barley	17,772	953	8,157
Rye	155,365	17,618	88,315
Potatoes	2,661,774	37,160	1,260,100
Sweet potatoes	925,786	14,178	507,038
Hemp (pounds)	10,303,560	14,107	468,454
Tobacco (pounds)	314,288,050	384,805	18,541,982
Hay and forage (tons)	776,534	683,139	6,100,647

Kentucky is the principal tobacco-growing State of the Union, and in 1900, out of a total of 868,163,275 pounds grown in the United States, Kentucky produced 314,288,050. Corn and wheat are the leading cereals, and hemp is largely grown. Some cotton is raised west of the Tennessee river. In manufactures the State does not rank so well, but in this regard there has been a great development within the last two decades. Whisky is the chief product. The State is well supplied with railroads; it has no debt, except to its own school fund, and has a surplus in its treasury. Much has been done of late years in the interest of education, and the State has a good school system and many colleges and institutions for higher education. The Transylvania University (now Kentucky University) was founded in 1798. The State possesses a permanent school fund and a school income derived from general and special taxes. There are separate schools for colored pupils.

The population of Kentucky in the year 1900 was 2,147,174, and at the U. S. census of 1890 was 1,858,635. Its most important city both for commerce and population is Louisville (*q. v.*). Frankfort is the capital, and other important towns are Covington, Newport, Lexington, Paducah and Maysville.

Kentucky was first explored by Daniel Boone (*q.v.*), who led a small party from North Carolina in 1769. Its name is said to signify "the dark and bloody ground," and the territory was the scene of many conflicts between whites and Indians, which justified the name. The first permanent settlement was made at Harrodsburg in 1774, and the whole of the territory now Kentucky was then included nominally in Virginia. The early settlers came from Virginia, Maryland, and North Carolina, and many of the Virginia troops who had served in the War of Independence and obtained bounties of land, located in Kentucky. Slavery was introduced, and in 1790 the population numbered 73,667, of whom 12,430 were slaves. In 1792 Kentucky was admitted into the Union, and the population increased very rapidly. The State troops took part in the fighting on the river Raisin, during the war of 1812–14. The Kentucky troops also bore an honorable part in the Mexican war. At the outbreak of the civil war, Kentucky had a population of 1,155,684, of whom 225,483, or almost one-fifth were slaves. The people were divided as to the great questions soon to be settled by the arbitrament of the sword. In April, 1861, the governor refused to furnish the quota of men demanded by Lincoln's first proclamation, and the legislature indorsed his action. The Federal troops occupied the northern counties, and the Confederate forces moved into the southern section a few days later (September, 1861). Kentucky protested against both invasions, and the able-bodied men gravitated into either army, as their geographical situation and their personal views impelled them. The Federal army held the State almost continuously during the war, and nearly 100,000 men were raised within it for the Union army, while 40,000 Kentuckians cast in their fortunes with the South. But Kentucky never went out of the Union. Since the close of the war the State has steadily prospered.

KENYON, Lloyd Kenyon, Lord, an English lawyer and lord chief-justice of England, was born at Gredington, Flintshire, England, October 5, 1732. Through the influence of Lord Thurlow, Kenyon in September, 1780, entered the House of Commons as member for Hindon, and in April, 1782, he was, through the same friendship, appointed attorney-general in Lord Buckingham's administration, an office which he also continued to hold under Pitt. In 1784 he received the mastership of the rolls, and was created a baronet. As his rough and irritable temper had also gained him several enemies, his elevation in 1788 to the lord chief-justiceship as successor to Lord Mansfield was by no means popular with the bar. The same year he was raised to the peerage as Baron Kenyon of Gredington. The decisions of no other judge in the court of Queen's Bench have been more seldom overruled. He died at Bath, April 4, 1802.

KEOKUK, chief city of Lee county, Iowa, occupies a lofty site on the west bank of the Mississippi, two miles above the mouth of the Des Moines tributary, and about 200 miles above St. Louis. It is situated in the extreme southeast corner of the State (whence its name "Gate City"); its streets are spacious, and its houses handsome, although mostly of brick. Keokuk contains several churches, a medical college (founded in 1849), a good system of public schools, and a public library. Pork-packing, iron-founding, and smaller industries are carried on. The city is at the junction of seven railways, which, with its advantages of water communication, bring it an important trade. A canal, nine miles in length, round the lower rapids of the Mississippi, which formerly obstructed the navigation, has been constructed by the United States Government at a cost of $8,000,000. Keokuk has been a port of entry since 1854. Population in 1900, 14,641.

KEPLER, John, one of the founders of modern astronomy, was born, December 27, 1571, at Weil, in the duchy of Würtemberg. His schooling began at Leonberg in 1577—the year, as he himself tells us, of a great comet. A brilliant examination for the degree of bachelor procured him, in 1588, admittance on the foundation to the university of Tübingen, where he laid up a copious store of classical erudition, and imbibed Copernican principles from the private instructions of his teacher and lifelong friend, Michael Maestlin. As yet, however, he had little knowledge of, and less inclination for, astronomy; and it was with extreme reluctance that he turned aside from the more promising career of the ministry to accept, early in 1594, the vacant chair of that science at Gratz, placed at the disposal of the Tübingen professors by the Lutheran states of Styria.

He early attained to the settled conviction that for the actual disposition of the solar system some abstract intelligible reason must exist, and this, after much meditation, he believed himself to have found in an imaginary relation between the "five regular solids" and the number and distances of the planets. He notes with exultation July 9, 1595, as the date of the pseudo-discovery, the publication of which in *Prodromus Dissertationum Cosmographicarum seu Mysterium Cosmographicum* (Tübingen, 1596) procured him much fame, and a friendly correspondence with the two most eminent astronomers of the time, Tycho Brahe and Galileo.

In the year 1598 the Archduke Ferdinand, on assuming the government of his hereditary dominions, issued an edict of banishment against Protestant preachers and professors. Kepler immediately fled to the Hungarian frontier, but, by the favor of the Jesuits, was recalled and reïnstated in his post. The gymnasium, however, was deserted; the nobles of Styria began to murmur at subsidizing a teacher without pupils; and he found it prudent to look elsewhere for employment. He first turned to his native country; but his refusal to subscribe unconditionally to the rigid formula of belief adopted by the theologians of the Tübingen permanently closed against him the gates of his *alma mater*. His embarrassment was relieved by a letter from Tycho Brahe offering him the position of assistant in his observatory near Prague, which, after a preliminary visit of four months, he accepted. The arrangement was made just in time; for on August 7, 1600, he received definitive notice to leave Gratz, and, having leased his wife's property, departed with his family for Prague, September 30th. His relations with Tycho were not of an entirely agreeable character. The Danish astronomer, though benevolent, was haughty and overbearing; Kepler's natural irritability was aggravated by prolonged fever, by pecuniary anxieties, and by domestic mismanagement. Nevertheless, after one violent quarrel, smoothed over by mutual concessions, they maintained an amicable intercourse, unexpectedly terminated by Tycho's death, October 24, 1601. A brilliant and prosperous career seemed by this event to be thrown open to Kepler.

The main task of his life was not meanwhile neglected. This was nothing less than the foundation of a new astronomy, in which physical cause should replace arbitrary hypothesis. A preliminary study of optics led to the publication, in 1604, of his *Astronomiæ pars optica*, containing important discoveries in the theory of vision, and a notable approximation toward the true law of refraction. But it was not until 1609 that, the "great Martian labor" being at length completed, he was able, in his own figurative language, to lead the captive planet to the foot of the imperial throne. From the time of his first introduction to Tycho he had devoted himself to the investigation of the orbit of Mars, which, on account of its relatively large eccentricity, had always been especially recalcitrant to theory, and the results appeared in *Astronomia nova aitiologetos seu Physica cœlestis tradita commentariis de motibus stellæ Martis* (Prague, 1609). In this, the most memorable of Kepler's multifarious writings, two of the cardinal principles of modern astronomy—the laws of elliptical orbits and of equal areas—were established; important truths relating to gravity were enunciated, and the tides ascribed to the influence of lunar attraction; while an attempt to explain the planetary revolutions in the then backward condition of mechanical knowledge produced a theory of vortices closely resembling that afterward adopted by Descartes. Having been provided, in August, 1610, by Ernest, archbishop of Cologne, with one of the new Galilean instruments, Kepler began, with unspeakable delight, to observe the wonders revealed by it. He had welcomed with a little essay Galileo's first announcement of celestial novelties; he now, in his *Dioptrice* (Augsburg, 1611), expounded the theory of refraction by lenses, and suggested the principle of the "astronomical" or inverting telescope. Indeed the work may be said to have founded the branch of science to which it gave its name.

His observations on the three comets of 1618 were published in *De Cometis*, contemporaneously with the *Harmonice Mundi* (Augsburg, 1619), of which the first lineaments had been traced twenty years previously at Gratz. This extraordinary production is memorable as having announced the discovery of the "third law"—that of the sesquiplicate ratio between the planetary periods and distances.

The insurmountable difficulties presented by the lunar theory forced Kepler, after an enormous amount of fruitless labor, to abandon his design of comprehending the whole scheme of the heavens in one great work to be called *Hipparchus*, and he then threw a portion of his materials into the form of a dialogue intended for the instruction of general readers. The *Epitome Astronomiæ Copernicanæ* (Linz and Frankfort, 1618–21), a lucid and attractive textbook of Copernican science, was remarkable for the prominence given to "physical astronomy," as well as for the extension to the Jovian system of the laws recently discovered to regulate the motions of the planets. The first of a series of ephemerides, calculated on these principles, was published by him at Linz in 1617; and in that for 1620, dedicated to Napier, he for the first time employed logarithms. This important invention was eagerly welcomed by him, and its theory formed the subject of a treatise entitled *Chilias Logarithmorum*, printed in 1624, but circulated in manuscript three years earlier, which largely contributed to bring the new method into general use in Germany.

His studies were, however, interrupted by a painful family trouble. The restless disposition and unbridled tongue of Catherine Kepler, his mother, created for her numerous enemies in the little town of Leonberg; while her unguarded conduct exposed her to a species of calumny at that time but too readily circulated and believed. As early as 1615 suspicions of sorcery began to be spread against her, which she, with more spirit than prudence, met with an action for libel. The suit was, by the connivance of the judicial authorities, purposely protracted, and at length, August 5, 1620, the unhappy woman, then in her seventy-fourth year, was arrested on a formal charge of witchcraft. Kepler immediately hastened to Würtemberg, and devoted a whole year to the zealous advocacy of her cause. It was owing to his indefatigable exertions that, contrary to general expectation, she was acquitted, after having suffered thirteen months' imprisonment and endured with undaunted courage the formidable ordeal of "territion," or examination under the imminent threat of torture. She survived her release only a few months, dying April 13, 1622.

Kepler's whole attention was now devoted to the production of the new tables. "Germany," he wrote, "does not long for peace more anxiously than I do for their publication." Financial difficulties, however, combined with civil and religious convulsions, long delayed the accomplishment of his desires. From June 24 to August 29, 1626, Linz was besieged, and its inhabitants reduced to the utmost straits by bands of insurgent peasants. The pursuit of science needed a more tranquil shelter; and accordingly, on the raising of the blockade, Kepler obtained permission to transfer his types to Ulm, where, in September, 1627, the *Rudolphine Tables* were at length given to the world. Although by no means free from errors, their value appears from the fact that they ranked for a century as the best aid to astronomy. Appended were tables of logarithms and of refraction, together with Tycho's catalogue of 777 stars, enlarged by Kepler to 1,005.

The work of Kepler's life was now virtually completed, but not so its vicissitudes. His claims upon the insolvent imperial exchequer amounted by this time to 12,000 florins. The emperor Ferdinand II., too happy to transfer the burden, countenanced an arrangement by which Kepler entered the service of the duke of Friedland (Wallenstein), who assumed the full responsibility of the debt. In July, 1628, Kepler accordingly arrived with his family at Sagan in Silesia, where he applied himself to the printing of his ephemerides up to the year 1636, and whence he issued, in 1629, a *Notice to the Curious in Things Celestial*, warning astronomers of approaching transits. That of Mercury was actually seen by Gassendi in Paris, November 7, 1631 (being the first passage of a planet across the sun ever observed); that of Venus, predicted for December 6th following, was invisible in western Europe. Wallenstein's promises to Kepler were but imperfectly fulfilled. In lieu of the sums due, he offered him a professorship at Rostock, which Kepler declined, being unwilling to compromise his claim. An expedition to Ratisbon, undertaken for the purpose of representing his case to the Diet, terminated his life. Shaken by the journey, which he had performed entirely on horseback, he was attacked with fever, and died at Ratisbon, November 15 (N. S.), 1630, in the fifty-ninth year of his age.

KERAK, a town of Syria, situated about ten miles east of the southern end of the Dead Sea, on the summit of a rocky hill some 3,000 feet above sea-level. The inhabitants are estimated at 8,000, of whom about one-fourth are Greek Christians. They are fierce and truculent; and, though they were formerly renowned for hospitality, their rapacious treatment of their European visitors has brought them into very bad repute.

KERBELA, or MESHHED-HOSEIN, a town of Asiatic Turkey, in the vilayet of Bagdad, is situated in a fertile and well-cultivated district about sixty miles south-southwest of Bagdad, and about twenty miles west of the Euphrates, from which a very ancient canal extends to it. The population, necessarily fluctuating, was estimated in 1878 at 60,000; it is now (1902) about 70,000.

KERGUELEN'S LAND, KERGUELEN ISLAND, or DESOLATION ISLAND, an island in the Southern Ocean, to the southeast of the Cape of Good Hope and southwest of Australia, and nearly half-way between them. To the south is Heard Island, and west-northwest the Crozets and the Marion Group. Its extreme length is about eighty-five miles, and its extreme breadth seventy-nine, but the area is only about 2,050 square miles. The island is throughout mountainous, presenting from the sea in some directions the appearance of a series of jagged peaks. The various ridges and mountain masses are separated by steep-sided valleys, which run down to the sea, forming deep fjords, so that no part of the interior is more than twelve miles from the sea. The coast-line is extremely irregular, many of the fjords being bounded by long, steep, rocky promontories. These, at least on the north, east, and south, form a series of well-sheltered harbors; as the prevailing winds are westerly, the safest anchoring ground is on the northeast. Christmas Harbor on the north and Royal Sound on the south are noble harbors, the latter with a labyrinth of islets interspersed over upward of twenty miles of landlocked waters. The scenery is generally magnificent, and often singularly picturesque. A district of considerable extent in the center of the island is occupied by snowfields, whence glaciers descend east and west to the sea. The whole island, exclusive of the snowfields, abounds in fresh-water lakes and pools in the hills and lower ground. Hidden deep mudholes are frequent.

One of the most characteristic animals of the island is the sea elephant, which is found in considerable abundance, even far up the streams that flow into the fjords. The sea-leopard is pretty abundant on the coasts. All parts of the coast, and even the lower slopes, are covered with penguins of various species, mainly the Johnny penguin.

The island is frequented by sealers and whalers, but has no permanent inhabitants. Kerguelen's Land was discovered by the French navigator Kerguelen Tremarec (born 1745, died 1797), on February 13, 1772, and partly surveyed by him in the following year.

KERKÚK, or KERKOOK, a town of Asiatic Turkey, in the vilayet of Bagdad, is situated on the right bank of the Khasa Tshai, about 140 miles north of the city of Bagdad.

KERMAN. See KIRMAN.

KERMANSHAH. See KIRMANSHAHAN.

KERMES, a crimson dye, now superseded by cochineal, obtained from *Coccus ilicis*, L., an hemipterous insect found in Spain, Italy, the south of France, and other parts of the Mediterranean region, feeding on *Quercus coccifera*, a small shrub from two to five feet high. The discovery of the animal nature of kermes is due to Eméric, Garidel, and Cestoni. Until the year 1714 it was thought to be a gall or excrescence.

To dye spun worsted with kermes, the material is first boiled for half an hour with bran in water, and then for two hours in a fresh bath containing one-fifth of Roman alum and one-fifth of tartar, to which "sour water" is commonly added. It is then taken out and laid in a linen bag for some days in a cool place. In order to obtain a full color it is then put in a warm bath as at the first boiling, the bath containing as much kermes as is equal to three-fourths or even the whole weight of the worsted used. For cloth one-fourth less of the salt and kermes is required. The color imparted by kermes has much less bloom than the scarlet made with cochineal, hence the former has fallen into disuse.

KERNER, JUSTINUS ANDREAS, a German poet and medical writer, was born in Ludwigsburg, Würtemberg, on September 18, 1786. Having completed his studies in 1809, Kerner spent some time in travel. In 1815 he received a medical appointment in Gaildorf, and in 1819 was transferred to Weinsberg, where he spent the rest of his life. He died on February 21, 1862. Kerner takes rank as one of the best of the Swabian school of poets, who had in some respects a close affinity to the Romantic school, but aimed at greater simplicity and clearness.

KERRY, a maritime county of Ireland, in the province of Munster, bounded on the west by the Atlantic Ocean, north by the estuary of the Shannon, which separates it from Clare, east by Limerick and Cork, and southeast by Cork. Its greatest length from north to south is sixty miles, and its greatest breadth from east to west fifty-eight miles. The area comprises 1,859 square miles; the pop. (1901), 165,331.

The principal rivers are the Blackwater, which, rising in the Dunkerran mountains, forms for a few miles the boundary line between Kerry and Cork, and falls into the Kenmare River; the Ruaughty, which with a course resembling the arc of a circle falls into the head of the Kenmare River; the Inny and Ferta, which flows westward, the one into Ballinskellig Bay and the other into Valentia Harbor; the Flesk, which flows northward through the lower lake of Killarney, after which it takes the name of the Laune, and flows northwestward to Dingle Bay; the Cara, which rises in the mountains of Dunkerran, and after forming several lakes falls into Castlemaine Harbor; the Maine, which flows from Castle Island southwestward to the sea at Castlemaine Harbor, receiving in its course the northern Flesk, which rises in the mountains that divide Cork from Kerry; and the Feale, Gale, and Brick, the junction of which forms the Cashin, a short tidal river which flows into the estuary of the Shannon. The lakes of Kerry are not numerous, and none of them are of great size, but those of Killarney form one of the most important features in the striking and picturesque mountain scenery amidst which they are situated. (See KILLARNEY.)

The county comprises nine baronies, and contains eighty-five civil parishes and two parts of parishes, and 2,682 townlands. There are six poor-law unions wholly within the county, viz., Cahirciveen, Dingle, Kenmare, Killarney, Listowel, and Tralee, and part of one, namely, Glin, the remaining portion being in Limerick. The county includes one parliamentary borough, Tralee, which in 1901 had a population of 9,000, the township of Killarney, and the towns of Dingle and Listowel. There are in the county twenty-four petty sessions districts and one part of a petty sessions district. Assizes are held at Tralee, and quarter sessions are held in the towns of Dingle, Kenmare, Killarney, Listowel, and Tralee. The county is within the Cork military district, and there is a barrack station at Tralee. The headquarters of the constabulary force is at Tralee, and subinspectors are stationed at Cahirciveen, Dingle, Kenmare, Killarney, and Listowel. Previous to the Union the county returned eight members to parliament, two for the county, and two for each of the boroughs of Tralee, Dingle, and Ardfert. At the Union the number was reduced to three, two for the county and one for the borough of Tralee.

The county is said to have derived its name from Ciar, who, along with his tribe the *Ciarraidhe*, is stated to have inhabited about the beginning of the present era the territory lying between Tralee and the Shannon. That portion lying south of the Maine was at a later period included in the kingdom of Desmond. Kerry suffered frequently from invasions of the Danes in the ninth and tenth centuries, until they were finally overthrown at the battle of Clontarf in 1014. In 1172 Dermot MacCarthy, king of Cork and Desmond, made submission to Henry II. on certain conditions, but was nevertheless gradually compelled to retire within the limits of Kerry, which was made shire ground in 1210. An English adventurer, Raymond le Gros, received from this MacCarthy a large portion of the county around Lixnaw. Thomas, grandson of Raymond, and king's sheriff in the counties of Cork, Waterford, and Kerry, was in 1295 made lord chief-justice of Ireland. Of his two sons John, the eldest, was created earl of Kildare, and Maurice in 1329 became earl of Desmond, and with certain exceptions received all the royal liberties which the king had in the county of Kerry. After the attainder of Thomas, earl of Desmond, in 1467, his kinsmen took up arms against the English, until at last the king was glad to guarantee the earl's elder son the full possession of his father's privileges. In consequence, however, of the rebellion of Gerald, the sixteenth earl, the estates of the Desmonds, 574,628 acres in extent, were in 1583 forfeited to the crown, and parceled into manors and seignories of 12,000, 8,000, 6,000, and 4,000 acres, which were divided among English noblemen and gentlemen. The Irish took advantage of the disturbed state of England at the time of the Puritan revolution to attempt the overthrow of the English rule in Kerry, and ultimately obtained possession of Tralee, but in 1652 the rebellion was completely subdued, and a large number of estates were afterward confiscated.

KERTCH, the ancient Panticapæon, a seaport town of Russia in the government of Taurida, situated at the eastern extremity of the Crimea, on the Cimmerian Bosporus (Strait of Yenikale or Strait of Kertch). Like most towns built by ancient Greek colonists, it occupies a beautiful situation clustering around the foot and climbing the sides of the hill (now named after Mithridates) on which stood the ancient Acropolis. In 1898 the population of Kertch amounted to 28,982.

KÉSMÁRK, or KÄSMARK, an ancient town in the cis-Tisian county of Szepes (Zips), Hungary, is situated on the Poprád, eleven miles northwest of Löcse (Leutschau).

KESTREL (French *Cresserelle* or *Crécerelle*, Old French *Quercerelle* and *Quercelle*, in Burgundy *Cristel*), the English name for one of the smaller Falcons, originating probably from its peevish and languid cry. The ordinary kestrel is by far too common and well-known a bird to need any description. It is almost entirely a summer migrant, coming from the south in early spring and departing in autumn, though examples (which are nearly always found to be birds of the year) occasionally occur in winter, some arriving on the eastern coast in autumn. It is most often observed while practicing its habit of hanging in the air for a minute or two in the same spot, by means of short and rapid beats of its wings, as, with head pointed to windward, and expanded tail, it is looking out for prey—which consists chiefly of mice, but it will at times take a small bird, and the remains of frogs, insects, and even earthworms have been found in its crop. It generally breeds in the deserted nest of a crow or pie, but frequently in rocks, ruins, or even in hollow trees—laying four or five eggs, mottled all over with dark brownish red, sometimes tinged with orange and at other times with purple. Though it may occasionally snatch up a young partridge or pheasant, the kestrel is quite the most harmless bird-of-prey, if it be not, from its destruction of mice and cockchafers, a most beneficial species. It is a species of very wide range, extending over nearly the whole of Europe and the greater part of Asia. One of the species deserving of notice is that of America, *T. sparverius*, commonly known in Canada and the United States as the "Sparrow-Hawk"—a beautiful little bird, though not more courageous than the rest of its relations.

KESWICK, a market-town of Cumberland, England, is situated on the left bank of the Greta, close to Derwentwater or Keswick Lake, about thirty miles south of Carlisle, and 300 miles from London by rail. The population in 1901 was about 6,000.

KESZTHELY, a market-town in the trans-Danubian county of Zala, Hungary, is picturesquely situated near the western extremity of Lake Balaton, about ninety-seven miles south of Pozsony (Pressburg). Keszthely is chiefly noted for its well-organized agricultural institute, founded by Count George Festetics, and known as the "Georgicon." Population, 5,393.

KETCHUP, a sauce or relish prepared principally from the juice of mushrooms and of many other species of edible fungi, salted for preservation and variously spiced. The term ketchup, written also catsup and katchup, is said to be of Japanese origin. The following may be taken as a typical example of the ingredients and method of preparation of ordinary ketchup. Freshly gathered mushrooms are placed in a wooden vessel and sprinkled with salt. They are left for two or three days, during which time they are repeatedly stirred and turned over. The juice is then squeezed out, and to every gallon of the juice there is added of crushed cloves and mustard seed half an ounce each, and of black pepper, ginger, and allspice each an ounce. The mixture is boiled gently, decanted, and left to macerate for about two weeks, after which it is strained off and bottled. Should it show any tendency to putrefaction it is again boiled with the addition of salt and spices. It is of the utmost consequence to avoid copper, lead, and pewter vessels or implements in the preparation of ketchup; as far as possible glazed earthenware vessels alone should be used. The juices of various fruits, such as cucumbers, tomatoes, and especially green walnuts, are used as a basis of ketchup, and shellfish ketchup, from oysters, mussels, and cockles, is also made; but in general the term is restricted to sauces having the juice of edible fungi as their basis.

KETI, a town and port in Kurrachee district, Sind, India, situated on the Hajámro branch of the Indus. Population about 4,000. The town is a large seat of river trade, and ranks next to Currachee among the ports of Sind.

KETTERING, a market-town of Northamptonshire, England, is built on a slope near the Ise, a tributary of the Nen, fourteen miles northeast of Northampton, and seventy-five miles northwest of London. Population in 1901 was 16,500.

KEUNJHAR, or KEUNJUR, a petty state in Orissa, India, lying between 21° 1′ and 22° 9′ 30″ north latitude, and 85° 14′ and 86° 24′ 35″ east longitude, with an area of 3,096 square miles, and a population, in 1889, of 181,871. A Government elephant establishment is maintained at Keunjhar.

KEUNTHAL, a petty hill state in the Punjab, India, between 30° 55′ 30″ and 31° 6′ north latitude, and 77° 10′ and 77° 26′ east longitude, with an area of 116 square miles, and an estimated population of 50,000.

KEW, a village and parish in the county of Surrey, England. The village is pleasantly situated on the south bank of the Thames, six miles by road west-southwest of Hyde Park corner. It has communication with London by steamer and by several railway routes. By a stone bridge of seven arches, erected in 1789, it is connected with Brentford on the other side of the river. The village consists chiefly of a row of houses with gardens attached, situated on the north side of a green, to the south of which is the church and churchyard, and at the west the principal entrance to Kew gardens. In the vicinity there are many fine villas. From remains found in the bed of the river near Kew bridge it has been conjectured that the village is an old British settlement. The name first occurs in a document of the reign of Henry VII., where it is spelled Kayhough. The free school originally endowed by Lady Capel in 1721 received special benefactions from George IV., and the title of "the king's free school."

The estate of Kew House about the end of the seventeenth century came into the possession of Lord Capel of Tewkesbury, and in 1721 of Samuel Molyneux, secretary to the prince of Wales, afterward George II. After his death it was leased by Frederick, prince of Wales, son of George II., and it continued to be the residence of members of the royal family until the estate was purchased about 1789 by George III., who devoted his chief leisure to its improvement. The old house was pulled down in 1802. Dutch House, adjoining Kew House, afterward sold by Robert Dudley, earl of Leicester, to Sir Hugh Portman, a Dutch merchant, was purchased by George III. as a nursery for the royal children. It is a plain brick structure, and is now known as Kew Palace. The Royal Botanic Gardens of Kew originated in the exotic garden formed by Lord Capel and greatly extended by the princess dowager, widow of Frederick, prince of Wales, and by George III., aided by the skill of the Aitons and of Sir Joseph Banks. In 1840 the gardens were adopted as a national establishment, and transferred to the department of woods and forests. The gardens proper, which originally contained only about eleven acres, have been increased to seventy-five acres, and the pleasure grounds or arboretum adjoining extend to 270 acres.

KEW-KEANG FOO, a prefecture and prefectural city in the province of Keang-se, China. The city is situated on the south bank of the Yang tsze Keang, fifteen miles above the point where the Kan Keang flows into that river from the Po-yang lake. The walls are from five to six miles in circumference, and are more than usually strong and broad. As is generally the case with old cities in China, Kew-Keang has repeatedly changed its name. Kew-Keang has played its part in the history of the empire, and has been repeatedly besieged and sometimes taken. The last time this worse fate overtook it was in February, 1853, when the Taiping rebels gained possession of the city. After their manner they looted and utterly destroyed it, leaving only the remains of a single street to represent the once flourishing town.

KEY WEST (Spanish, *Cayo Hueso*, Bone Reef), a coral island, seven miles long, from one to two miles broad, and eleven feet above sea-level, lies sixty miles south of Cape Sable, the most southerly point of the mainland of Florida. It belongs to Monroe county, Fla., and forms one of the Florida Keys. The soil is thin, but supports a tolerably dense tropical vegetation, including various fruits. In the absence of fresh springs, the water supply is derived from rain and distillation. The healthy climate attracts an annually increasing number of invalids from the north. The inhabitants are chiefly of Cuban and Bahaman extraction, and speak a Spanish patois.

KEY WEST, chief city of Monroe county, Fla., covers nearly half of Key West island. It has broad streets, arranged on the rectangular plan; and the houses, almost all wooden, are picturesquely surrounded by tropical shrubs and plants. Described as being "to Cuba what Gibraltar is to Ceuta, to the Gulf of Mexico what Gibraltar is to the Mediterranean," Key West is one of the chief naval stations of the United States, and is strongly fortified. The principal manufacture is that of cigars, begun in 1867, and steadily prospering. Previous to 1874, when a hurricane destroyed the works, 30,000 bushels of salt were annually produced on the island by solar evaporation. Fishing, sponge-gathering, and turtle-catching occupy many of the inhabitants; and a large number of small vessels are employed in "wrecking," *i.e.*, in saving goods and rendering assistance to vessels that have failed to clear the dangerous Florida reef. The population of the city in 1900 was 17,114.

KHABAROVKA, the chief town of the Maritime Province, in eastern Siberia, is situated on high crags, on the right bank of the Amoor, amidst wide forests and marshes, at the confluence of the Ussuri. Since its foundation in 1857 it has always been the chief center for the trade in sables, purchased yearly from the aborigines to the average amount of 20,000 pieces, and sent to Irkutsk and to Russia.

KHAIRÁBÁD, or KHYRABAD, the chief town of Sitápur district, Oudh, India, situated five miles south of Sitápur civil station and cantonment. It is the fifth largest town in Oudh, with a population in 1890 of 20,000, made up of Hindus and Mohammedans in about equal numbers. The town contains forty mosques and thirty Hindu temples, besides a beautiful group of sacred Mohammedan buildings. A large fair is held here in January, lasting ten days, and attended by an average of 60,000 persons. A second fair is held at *Dasahára* festival, attended by about 15,000 persons. The annual value of *bázár* sales is about £34,000.

KHAIRPUR, or KHYRPOOR, a native state in Sind, India, bounded on the north by Shikápur district, south by Jáisalmír state, east by Hyderabad district, and west by the Indus river.Area, 6,109 sq. m.; pop. (1901), 140,000.

KHÁMGAON, a town in Akola district, Berar, India, with a population in 1867 of 9,432. The cotton market—the largest in the province—was established about 1820.

KHÁNDESH, or CANDEISH, a district of Bombay

Presidency, India, with an area of 10,162 square miles. The chief town is Dhulia.

KHANDPÁRA, a petty state in Orissa, India, with an area of 244 square miles, and a population in 1901 of 65,000, mostly Hindus.

KHANDWA, or CUNDWAH, the chief town and headquarters station of Nimár district, Central Provinces, India. Population about 15,119.

KHARKOFF, a government of European Russia, surrounded by those of Kursk, Poltáva, Ekaterinoslaff, and Vŏronezh, and belonging partly to the basin of the Don and partly to that of the Dnieper. The area is 21,041 square miles; pop. (1898), 2,510,000.

KHARKOFF, the chief town of the above government, is situated in the valley of the Donets, 462 miles from Moscow and 137 miles from Kursk. The four annual fairs are among the busiest in Russia, more especially the Krestchenskaya or Epiphany fair, which is opened on January 6th (18th). The turn-over is estimated at from $15,000,000 to $20,000,000.

KHARPUT (officially MA'MURAT-EL-'AZÍZ), a town of Armenia, the seat of a mutasarrif, is situated about sixty miles north of Diarbekir on the highway to Siwas, and occupies a peculiarly picturesque position on a rocky eminence rising above the great plain through which the waters of the eastern Euphrates describe a devious passage.

KHARTÚM, or KHARTOUM (erroneously Kartum), the chief town of the Egyptian Soudan situated in 15° 37′ N. latitude, and 22° 54′ E. longitude, on the peninsula formed by the junction of the White and the Blue Nile. The level of the stream just below the town is 1,240 feet. The principal landing-place and the dockyards are on the Blue river. The surrounding country is flat and open, the forests described by the first European visitors having disappeared for a considerable distance up the river; but there are many gardens within and around the town planted with date-palms, fig and orange trees, etc. The town, though consisting chiefly of mean mud-built huts, has a considerable number of substantial modern buildings, the most imposing of which is the stone-faced palace of the governor. As the center of the great caravan routes from the interior of Africa, Khartûm carries on a good legitimate trade, but the inhabitants have always shown a preference for slave traffic when the governor has proved indulgent or inefficient. Khartúm is the seat of a Roman Catholic mission, founded by Pope Gregory XVI. in 1846, and long conducted by Dr. Ignaz Knoblecher, of Protestant missions, and of several European consulates. The British consulate, established in 1849, and latterly held by Petherick, was abolished in 1864 under circumstances which gave rise to much comment. Khartúm has of late years risen into melancholy prominence by reason of the sad fate of General Gordon. About 1880 a "false prophet," who took to himself the title of El Mahdi (the guided by God), arose in Egypt and preached the downfall of Turkish rule in the Soudan. An attempt on the part of the government to suppress him and his following met with armed resistance, and the insurrection rapidly augmented in strength. In 1884 General Gordon was sent to Khartúm to secure the withdrawal of the Egyptian garrisons from the Soudan. Here the exigencies of the case demanded that he should oppose the followers of the Mahdi with his inadequate forces, and, as he refused to leave the Egyptian garrisons to their fate, he was compelled to await reënforcements, which, owing to the cowardly delay of the English government, were not sent until too late; and, when Sir Garnet Wolseley's relief expedition arrived, on January 28, 1885, the noble Gordon had perished by assassination. The expedition withdrew, and not a blow was struck to avenge the death of Gordon. The Mahdi has since died, but his followers yet hold the Soudan. As to the actual status of affairs in the Soudan, no positive information has been obtained. The population amounts to 50,000, including, in addition to the natives, the usual medley elements of an Egyptian town.

KHÁSI AND JÁINTIA HILLS, a district in Assam, India. Its approximate area is 6,157 square miles. Population, 169,320.

KHATMÁNDU, the capital of the kingdom of Nepál, India, situated on the bank of the Vishnumati river at its junction with the Bághmati. The town, which is said to have been founded by Rájá Gunakámadeva about 723, now contains a population estimated at about 50,000, occupying 5,000 houses made of brick, and usually from two to four stories high.

KHAZARS. This vanished people, who appear also as Chozars, as Khazirs in Armenian and Khwalisses in Russian chronicles, Ugri Bielii in Nestor, and Kosa (?) in Chinese, occupied a prominent place among the secondary powers of the Byzantine state-system. Their home was in the spurs of the Caucasus and along the shores of the Caspian—the "sea of the Khazars;" and their cities, all of them populous and civilized commercial centers, were *Itil*, the capital, upon the delta of the Volga, the "river of the Khazars," *Semender* (Tarkhu), the older capital, *Khamlidje* or *Khalendsch*, *Belendscher*, the outpost toward Armenia, and *Sarkel* on the Don.

In the interval between the decline of the Mohammedan empire and the rise of Russia the Khazars reached the zenith of their power. The merchants of Byzantium, Armenia, and Bagdad met in the markets of Itil (whither since the raids of the Mohammedans the capital had been transferred from Semender), and traded for the wax, furs, leather and honey that came down the Volga. So important was this traffic held at Constantinople that, when the portage to the Don was endangered by the irruption of a fresh horde of Turks (the Petchenegs), the emperor Theophilus himself dispatched the materials and the workmen to build for the Khazars a fortress impregnable to their forays (834). Famous as the one stone structure in that stoneless region, the post became known far and wide among the hordes of the steppe as Sar-kel or the White Abode. Merchants from every nation found protection, justice, and perfect good faith in the Khazar cities. The Jews, expelled from Constantinople, sought a home among them, developed the Khazar trade, and contended with Mohammedans and Christians for the theological allegiance of the pagan people. The dynasty accepted Judaism (*circ.* 740), but there was equal tolerance for all, and each man was held amenable to the authorized code and to the official judges of the faith which he professed. At the Byzantine court the khakan was held in high honor. The emperor Justinian Rhinotmetus took refuge with him during his exile and married his daughter, 702. Justinian's rival Bardanes, in turn sought an asylum in Khazaria, and in Leo IV. (775) the grandson of a Khazar sovereign ascended the Byzantine throne. Khazar troops were among the bodyguard of the imperial court; they fought for Leo VI. against Simeon of Bulgaria (888); and the khakan was honored in diplomatic intercourse with the seal of three solidi, which marked him as a potentate of the first rank, above even the pope and the Carlovingian monarchs. Indeed, his dominion became an object of uneasiness to the jealous statecraft of Byzantium, and Constantine Porphyrogenitus, writing for his son's instruction in the government, carefully enumerates the Alans, the Petchenegs, the Uzes, and the Bulgarians as the forces he must rely on to restrain it.

KHELAT, the capital of Baluchistan, and the residence of the reigning khan, is situated at an elevation of 6,800 feet above the sea, in a narrow valley, which is bounded on the east by the mountain ranges extending to the province of Cutch Gundava; on the west is the Sha Mirdan, on the northern slope of which hill the town is built; on the south the valley is closed by low hills, while on the north it is of sufficient breadth to allow space for two or three small villages.

KHERI, a district of Oudh, India, with an area of 2,963 square miles.

KHERSON, a government of European Russia, on the borders of the Black Sea, and conterminous with Bessarabia, Podolia, Kieff, Ekaterinoslaff, and Taurida. The area is estimated at 27,523 square miles. The ports of Kherson, Otchakoff, Nikolaieff, and more especially Odessa are among the great outlets of Russian commerce; and Berislaff, Alexandriya, Elizabethgrad, Voznesensk, Olviopol, and Tiraspol play an important part in the inland traffic. In 1898 the total population of the government was 2,732,832; and besides Great and Little Russians it comprised Roumanians, Servians, Poles, Greeks, Germans, Gypsies, while no fewer than 44,107 were returned as Roman Catholics 48,902 as Protestants, 3,183 as Armenians, and 118,312 as Jews.

KHERSON, the chief town of the above government, is situated on the right bank of the Dnieper, about nineteen miles from its mouth. Population, 69,219.

KHIVA, an independent Uzbeg khanate of Turkestan, which occupies the fertile oasis stretching in a band of varying width along the left bank of the lower Oxus between Pitniak and the Sea of Aral. The inhabited district is about 200 miles in length, and has an average breadth of twenty-five to thirty miles—an area therefore of some 5,000 to 6,000 square miles.

This tract of territory is but a meager relic of the great kingdom which, under the name of Chorasmia, Kharezm (Khwárizm), or Urgentch, held the keys of the mightiest river in Central Asia, and formed in consequence a precious jewel for rivalry among Eastern potentates from an early period of the world's history. Great alterations, geographically and politically, have taken place since those times. The Oxus has changed its outlet, and no longer forms a waterway to the Caspian and thence to Europe. A great European power has arisen which has made gradual but important encroachments in Asia, and between this power on the north and the independent Turcoman tribes on the south the authority of the khan of Khiva has been dwarfed and circumscribed within the narrow limits above indicated.

Russia commenced her relations with Khiva in the seventeenth century. The warlike Cossacks of the Yaik during their raids across the Caspian learned of the existence of the rich territory of Khiva, and made an expedition to the chief town, Urgentch, at a time when the khan and his troops were absent. They carried off a large number of women and a rich booty, but were overtaken on their road home by the Khivans and killed to a man. Two subsequent expeditions under Atamans Nechai and Shemai proved equally disastrous to the Cossacks. These three expeditions were simply the raids of freebooters. In 1717, however, Peter the Great, having heard of the presence of auriferous sand in the bed of the Oxus, and desiring also to "open mercantile relations with India through Turan, and to release from slavery some Russian subjects," sent a properly equipped military force to Khiva. The command of the expedition, which consisted of 3,300 men and six guns, with three months' provisions, was intrusted to Prince Bekovitch Tcherkassky. After establishing a fortified base of operations on the east shore of the Caspian, Bekovitch collected his forces at the mouth of the Ural, and thence marched across the Ust Urt into Khivan territory. When within 100 miles of the capital, he was encountered by the forces of the khan. The battle lasted three days, and ended in victory for the Russian arms. The Khivans, however, induced the victors to break up their force into small detachments in order to facilitate supply, and then treacherously annihilated them in detail. This disaster did not prevent the Russians from sending embassies from time to time to the khan, but the representations of the envoys did not induce him to desist from enslaving Russian subjects or even to free those already in bondage. The Persian campaign which subsequently followed, the designs in other parts of Central Asia, and the constant embroilment of Russia in European wars caused Khivan affairs to recede temporarily to the background, and it was not until the third decade of the nineteenth century that the attention of the Muscovite Government was again directed to the khanate. In 1839 a force under General Perovsky, consisting of three and a half battalions, three Cossack regiments, and twenty-two guns, in all 4,500 men, with a large train of camels, moved from Orenburg across the Ust Urt to the Khivan frontiers, in order to occupy the khanate, liberate the captives, and open the way for trade. This expedition likewise terminated in disaster. The inaccessibility of Khiva was once more her safe guard. Before the force reached half-way toward its destination it was forced to return, in consequence of the severity of the weather and the loss of life among the men and animals. These expeditions had convinced the Russians that for the effective control of the relations of Khiva a nearer position must be sought. In 1847 they founded the Raim fort at the mouth of the Jaxartes. As this advance deprived the Khivans not only of territory, but of a large number of tax-paying Kirghiz, while the establishment of a fort gave the Russians a base for further operations, a collision became sooner or later inevitable. For the next few years, however, the attention of the Russians was taken up with Khokand, their operations on that side culminating in the capture of Tashkend in 1865. Free in this quarter, they directed their thoughts once more to Khiva. In 1869 Krasnovodsk on the east shore of the Caspian was founded, and in 1871–72 the country leading to Khiva from different parts of Russian Turkestan was thoroughly explored and surveyed. In 1873 an expedition to Khiva was carefully organized on a large scale. The forces placed at the disposal of General v. Kaufmann started from three different bases of operations —Krasnovodsk, Orenburg, and Tashkend. The whole force consisted of more than 10,000 men. Khiva was occupied by the Russians almost without opposition. All the territory (22,320 square miles and 800,000 souls) on the right bank of the Oxus was annexed to Russia and formed into the Amu Daria sub-district, while a heavy war indemnity was imposed upon the khanate. The difficult position financially in which the khan is thereby placed has more than once impelled him to beg the Russians to take the country under their administration. Russia, however, prefers the present arrangement of maintaining Khiva semi-independent instead of in complete subjection, for, not only does the collection of the indemnity fall upon the Khivan authorities, but the country shields the Russian possessions on the Oxus from the attacks of the Turcomans, which if made must first come in contact with the intervening territory of Khiva.

The government is an absolute despotism, and, subject to a certain moral control exercised by the proximity of the Russians, is entirely in the hands of the khan.

The climate is quite continental, but is healthy, and the people are long-lived.

Khiva, a fortified city, capital of the khanate of the same name, situated between two canals derived from the Oxus, and in the midst of green fields, orchards, and high poplars. Population, about 5,000.

KHOI, a town and district in the province of Azerbijan, Persia, toward the extreme northwest frontier, between Lake Urumiyah and the river Aras.

KHOJEND, or Hodjent, chief town of the Khojend and Jizak district in the province of Sír Daria or Jaxartes, ninety-six miles southeast from Tashkend, and on the direct road from Bokhara to Khokand.

KHOKAND, a city of Turkestan, was, previous to the Russian conquest, the capital of an independent khan, but, owing mainly to the fact that those who reside in it are subject to goitre, it has not been made the administrative center of the Russian province, (Ferghana, *q.v.*) The town is situated on the skirts of the Kashgar Devan ridge, which separates Kashgar from Ferghana, and it is traversed by three mountain gullies which send their scanty waters to the Jaxartes. Population, (1898), 82,054.

KHONSAR, a town in the province of Irak-Adjemi, Persia, ninety-two miles northwest of Ispahan on the Hamadan route, in a gorge of the hills, which here approach so close that all the intervening space is occupied by the houses and their garden plots.

KHORAMABAD, a town and fortress of Persia, capital of the province of Luristan, 138 miles west-northwest of Ispahan, 117 southeast of Kirmánsháhán.

KHORÁSAN, *i.e.*, "land of the sun," a geographical term originally applied to the eastern quarter of the four, named from the cardinal points, into which the ancient monarchy of the Sassanians was divided. After the Arabic conquests the name was retained both as the designation of a definite province and in a looser sense. Under the new Persian empire the expression has gradually become restricted to the northeastern portion of Persia proper, of which it now forms the largest province. The boundaries of this vast region have scarcely anywhere been accurately determined, and have constantly fluctuated, especially toward the north and east. Speaking generally, however, the province is conterminous on the east with Afghanistan and Sistan, north with Astrabad and the recently organized Russian trans-Caspian territory, northeast with the Turkoman country, west with Mazandaran and Irak-Adjemi, south with Farsistan and Kirman. It extends 500 miles northwest and southeast and 300 north and south, with a total area of about 150,000 square miles, and a population estimated at from 800,000 to over 1,000,000.

KHOSRU. See Persia.

KHOTAN, a city and district of eastern Turkestan, lying between the northern slopes of the Kuenlun mountains and the eastern portion of the Gobi (Takla Makan) desert. The district is well watered by a number of rivers, the most important of which, the Karakash and the Khotan Daria, meet to the north of the city. Both soil and climate are excellent, and the vegetation is characterized at once by variety and luxuriance. Population of city, 40,000.

KHOTIN, or Khoteen (this is the Russian form of the name, which appears in a great variety of disguises, partly dialectal), a fortified town of 21,000 inhabitants, in the government of Bessarabia, Russia, situated on the right bank of the Dniester, near the Austrian (Galician) frontier, and opposite Podolian Kamenetz.

KHULNA, or Culna, a town in Jessor district, Bengal, India, situated at a point where the Bhairab river debouches on the Sundarban delta, may be described as the capital of the Sundarbans, and for the last hundred years at least has been a place of considerable importance.

KHURJA, an important trading town and station on the East Indian Railway in Bulandshahr district, Northwestern Provinces, India. The population in 1901 was about 30,000.

KHUSHAB, or Koshaub, a town in Sháhpur district, Punjab, India, situated on the river Jhelum. Population about 9,500. Trade is carried on with Mooltan, Sakkar, Afghánistán, and the Deráját.

KHÚZISTAN, a province of West Persia, stretching about 200 miles north and south, with a mean breadth of 80 to 100 miles, and an area of 25,677 square miles. In the south is the rich alluvial lowland tract of Arabistan, "the most extensive and fertile plain in Persia."

KHYRPOOR. See Khairpur.

KIACHTA, or Kiakhta, a mercantile town of Siberia, and one of the chief centers of trade between Russia and China, is situated upon the Kiachta, an affluent of the Selenga, and on an elevated and barren expanse of country surrounded by mountains, in the Russian government of Transbaikal, about 280 miles southwest of the capital Tchita, and close to the Chinese frontier. Besides the lower town or Kiachta proper, the municipal jurisdiction comprises the fortified upper town of Troitskosavsk, about two miles to the north, and the settlement of Ust-Kiachta, ten miles further distant. Population, 9,000.

KIDDERMINSTER, a market-town and municipal and parliamentary borough of Worcestershire, England, is situated in the northwest corner of the county, on the Stour, near its junction with the Severn, on the Staffordshire and Worcestershire canal, and on the West Midland branch of the Great Western Railway, fourteen miles north from Worcester and eighteen miles southwest from Birmingham. At an early period Kidderminster had a large manufacture of broadcloths, but it is now chiefly celebrated for its carpets, the manufacture of which was introduced about the year 1735. Worsted spinning and dyeing are also carried on extensively, and there are iron foundries, tinplate works, breweries, malthouses, tanneries, flour-mills, and a paper-mill. The population of the municipal borough was, in 1901, about 45,000.

KIDNAPING is defined by Blackstone as the forcible abduction or stealing away of a man, woman, or child from their own country and sending them into another. The term is, however, more commonly applied to the offense of taking away children from the possession of their parents. The abduction or unlawfully taking away an unmarried girl under the age of sixteen years out of the possession and against the will of her father or mother, or any other person having the lawful care or charge of her, is a misdemeanor. The term is used in this sense in the laws of the United States. Bishop states the more correct acceptation of the word to be false imprisonment aggravated by the intent to carry the person away to another place, but not necessarily to another country.

KIEFF, Kiyeff, or Kiev, a southwestern government of European Russia, conterminous with those of Minsk, Poltava, Tchernigoff, Podolia, Kherson, and Volhynia. The area is estimated at 19,691 square miles. The population of the government is 3,576,125. The exarchate or diocese of Kieff and Galitsch is the oldest in Russia, and comprises 1,421 churches, 12 cathedrals, and 30 monasteries.

Kieff, capital of the above province, the "mother city" and Canterbury of Russia, is situated on the right or western bank of the Dnieper, 800 miles from St.

Petersburg, and 566 miles from Moscow on the highway between Moscow and Odessa. By railway it is connected on the one hand with Kursk and on the other hand with Odessa. In 1899 the total population was returned at 247,432.

KIEL, the chief town of the province of Schleswig-Holstein in Prussia, is picturesquely situated at the southern end of the Kieler Föhrde, about sixty-six miles northeast of Hamburg by rail. It consists of a somewhat cramped old town and a better built and more spacious newer part, increased since 1869 by the inclusion of Brunswick and Düsternbrook. Kiel is the most important naval harbor of Germany, and the station of the German Baltic fleet; the port and its approaches are very strongly fortified. The land defenses consist of eleven forts, completely encircling the town. The imperial dockyards on the east side of the haven include two large basins (one 235 yards square, the other 271 yards by 235 yards), connected by a canal seventy yards long, four dry docks (each 100 to 120 yards long by twenty-four or twenty-five yards wide), and a wet dock. Near them are the yards of a large shipbuilding company. The excellence and safety of Kiel harbor, whose only drawback is that it is frozen in winter, have made the town one of the principal ports of the Baltic. It carries on a very active trade with the Danish islands as well as with the Continent. Pop. (1901), 107,938.

KIELCE, the chief town of a government in Russian Poland, is situated about fifty miles northeast of Cracow, in the mountainous district of the Lysa Gora.

KIERKEGAARD, Soren, the greatest philosophical writer that Scandinavia has produced, was born at Copenhagen, May 5, 1813. He was a very serious and precocious boy, weak in health, morbid in character. Kierkegaard became a student at the university of Copenhagen, and took up theology as a profession, but never became a priest. It was not until 1842 that he began the composition of his greatest work, *Enten—Eller* ("Either—Or"), on which his reputation mainly rests; this appeared in 1843, and was immediately followed by a rapid succession of philosophical works, which formed at once an epoch in the history of Danish literature. From 1849 to 1854, however, he was silent as an author. In the last-mentioned year he published a polemical tract against Bishop Martensen, and the short remainder of his life was spent in a feverish agitation against the theology and practice of the state church. But his health, which had always been miserable, was growing worse and worse. In October, 1855, he took up his abode in one of the chief hospitals of Copenhagen, where he died, on November 11th, at the age of forty-two.

KILDARE, an inland county of Ireland, in the province of Leinster, is bounded on the west by Queen's county and King's county, north by Meath, east by Dublin and Wicklow, and south by Carlow. The area is 418,497 acres, or 654 square miles.

Administration.—The county comprises fourteen baronies, and contains 107 civil parishes, five parts of parishes, and 1,240 townlands. Judicially it is within the home circuit, and is divided into fourteen petty sessions districts and three parts of petty sessions districts. Assizes are held at Naas, and quarter sessions at Athy, Kildare, Maynooth, and Naas. The county contains portions of the six poor-law unions of Athy, Baltinglass, Carlow, Celbridge, Edenderry, and Naas. The military stations at Newbridge and the Curragh constitute the Curragh military district, and the barracks at Athy and Naas are included in the Dublin military district. There are three townships—Athy, Naas, and Newbridge. The principal other towns are Maynooth (which is the seat of a Roman Catholic college), Celbridge, Kildare, Monasterevan, Kilcullen, Leixlip, Kilcock, Castledermot, Ballymore Eustace, and Rathangan. Previous to the Union Kildare returned ten members to parliament, of whom eight represented boroughs; but now it sends only two, who sit as members for the county. Population, (1901), 63,469.

History.—The early inhabitants of the county are perhaps to be identified with Ptolemy's Coriondi. Afterward it formed part of the district of Caellan or Galen, which also included portions of Wicklow and Carlow, the principal chieftain being a representative of the family of Hy Caellan or McKelly, who had their residence at the moat of Ardscull, near Naas. According to a tale in the Book of Leinster, the original name of Kildare was *Druim Criaidh* (Drumcree), which it retained until the time of St. Brigit, after which it was changed to *Cilldara*, the church of the oak, from a very old oak under whose shadow the saint had constructed her cell. For some centuries it was under the government of the Macmurroughs, kings of Leinster, but along with the remainder of Leinster it was granted by Henry II. to Strongbow. On the division of the palatinate of Leinster among the five granddaughters of Strongbow, Kildare fell to Sibilla, the fourth daughter, who married William de Ferrars, earl of Derby. Through the marriage of the only daughter of William de Ferrars it passed to William de Vescy, who, when challenged to single combat by John Fitz Thomas, baron of Offaly, for accusing him of treason, fled to France. His lands were thereupon, in 1297, bestowed on Fitz Thomas, who in 1316 was created earl of Kildare, and in 1317 was appointed sheriff of Kildare, the office remaining in the family until the attainder of Gerald, the ninth earl, in the reign of Henry VIII. Kildare was a liberty of Dublin until 1296, when an act was passed constituting it a separate county.

KILIA, a seaport town of Roumania, formerly in the province of Moldavia, situated on the northern bank of the northern arm of the lower Danube, twenty miles from its mouth. Population, 9,079.

KILIAN, St., the apostle of Franconia, was, according to Hrabanus Maurus, a native of Ireland, whence along with his companions he went to eastern Franconia. After having preached the gospel in Würzburg, the whole party were put to death by the orders of an unjust judge of the name of Gozbert.

KILIMANJARO, a great snow-topped mountain in eastern Africa, has a height of 18,715 feet, and is believed to be the loftiest eminence of the whole continent. It stands completely apart from all neighboring heights, but is only one of many summits that crown the eastern edge of the great plateau of equatorial Africa. At a distance of 100 miles to the north, across the wide expanse of the Kaptei and Kikuyu plains, lie the less known mountains Kenia and Lemeru; and due west, at a distance of about thirty or forty miles, rises the noble mass of Mount Meru.

KILKENNY, an inland county of Ireland, in the province of Leinster, is bounded on the north by Queen's county, east by Carlow and Wexford, south by Waterford, and west by Waterford and Tipperary. Its greatest length from north to south is about forty-five miles, and its greatest breadth from east to west about twenty-five miles. The area is 507,254 acres, or about 800 square miles. Population (1901), 78,821.

The greater part of Kilkenny is a continuation forming the southeastern extremity of the Carboniferous Limestone plain of Ireland, but in the southeast this is bounded partly by the Cambro-Silurian rocks which run into the county from Wexford, and partly by a continuation of the granite mountains of Wicklow and Carlow, and it is interrupted in the north by an extensive hilly region forming part of the Castlecomer coalfield, which extends also into Queen's county and Tipperary. The field lies in the form of a broad basin, and rests on flagstone and black shale. The coal is anthracite, and the most productive portions of the bed are in the center of the basin at Castlecomer. Besides a large number of fossil plants, crustaceans of a rare species and also several peculiar reptilian remains have been found in the measures. The field is believed to contain nearly 80,000,000 tons of workable coal, and at present the annual yield is about 80,000 tons—the annual yield of Ireland being only about 130,000 tons.

Horses since 1850 declined from 17,161 to 16,933. The total number in 1881 used for agricultural purposes was 11,606. Cattle in 1850 numbered 72,908, and in 1881 had increased to 120,594.

Administration.—The county comprises ten baronies, 124 civil parishes and fifteen parts of parishes, and 1,601 townlands. The county of the city contains one parish and four parts of parishes. There are three poor-law unions wholly within the county, viz., Castlecomer, Kilkenny, and Thomastown, and portions of five, viz., Callan, Carrick-on-Suir, New Ross, Urlingford, and Waterford. The county includes the parliamentary borough of Kilkenny, part of that of New Ross, and the township of Callan. There are in the county and city sixteen petty sessions districts. Assizes are held at Kilkenny, and quarter sessions at Kilkenny, Pilltown, Urlingford, Castlecomer, Grace's Old Castle, Callan, and Thomastown. The county is within the Cork military district, and there are barrack stations at Kilkenny and Castlecomer. Previous to the Union Kilkenny returned sixteen members to Parliament, two representing the county. Since that period two members have been returned for the county, one for the city of Kilkenny. and one for New Ross, which, however, is situated chiefly in Wexford.

History.—Kilkenny received its name from St. Cannech or Canice, abbot of Aghaboe in Queen's county, who died in 598, and whose see was removed to Kilkenny in the beginning of the eleventh century. In the time of Ptolemy the county was inhabited by the Brigantes and the Cauci. Afterward it formed part of the kingdom of Uisraigagh, modernized into Ossory, which was tributary sometimes to Leinster and sometimes to Munster. In 1210 Kilkenny was formed into a county by King John. During the Revolution it was held by the Irish, and it also adhered strongly to the cause of James II. against William III.

KILKENNY, the chief town of the above county, a market-town, county of a city, and parliamentary borough, is finely situated on the Nore, and on the Great Southern and Western Railway, seventy-three miles southwest of Dublin and thirty-two miles north of Waterford. The population of the town proper, in 1901, was about 12,000.

KILLARNEY, a market-town of Ireland, county of Kerry, is situated on a branch line of the Dublin and Cork Railway, 180 miles southwest from Dublin and forty-seven miles north from Cork. On account of the beautiful scenery in the neighborhood, the town is much frequented by tourists. Within late years it has been greatly improved in appearance, and the streets are now spacious and well paved, while many good houses and several imposing public buildings have been erected.

KILLDEE, a common and well-known American Plover, so called in imitation of its whistling cry, the *Charadrius vociferus* of Linnæus, and the *Ægialitis vocifera* of modern ornithologists. About the size of a Snipe, it is mostly sooty-brown above, but showing a bright buff on the tail coverts, and in flight a white bar on the wings; beneath it is pure white except two pectoral bands of deep black. It is one of the finest as well as the largest of the group commonly known as Ringed Plovers or Ring Doterels, forming the genus *Ægialitis* of Boie. Mostly wintering in the south or only on the seashore of the more northern States, in spring it spreads widely over the interior, breeding on the newly-plowed lands or on open grassfields. The nest is made in a slight hollow of the ground, and is often surrounded with small pebbles and fragments of shells. Here the hen lays her pear-shaped, stone-colored eggs, four in number, and always arranged with their pointed ends touching each other, as is indeed the custom of most Limicoline birds. The parents exhibit the greatest anxiety for their offspring on the approach of an intruder; the hen runs off with drooping wings and plaintive cries, while the cock sweeps around, gesticulating with loud and angry vociferations. It is the best-known bird of its family in the United States, throughout which it is found in all suitable districts, but less abundantly in the northeast than further south or west.

KILLIZ, or KILIS, a town of Syria, in the Turkish vilayet of Aleppo, sixty miles north of the city of Aleppo. It is situated in an extremely fertile plain or plateau, completely surrounded with olive groves, the produce of which is reckoned the finest oil of all Syria; and its position on the regular route from Birejik on the Euphrates to southern Caramania gives it considerable traffic.

KILMARNOCK, a market-town, and parliamentary and municipal burgh, in the district of Cunningham, Ayrshire, Scotland, is situated on both sides of the Kilmarnock water, near its junction with the Irvine, twenty-one miles southwest of Glasgow by rail. The population in 1901 was 34,161.

KILSYTH, a burgh of barony in Stirlingshire, Scotland, is situated about twelve miles northeast of Glasgow.

KILWINNING, a market-town in Cunningham district, Ayrshire, Scotland, is situated on the right bank of the Garnock, twenty-six miles southwest of Glasgow by rail. Kilwinning is the traditional birthplace of Scottish Freemasonry; and Kilwinning Lodge, said to have been founded by the foreign architects and masons who came to build the abbey, is still looked up to as the mother-lodge in Scotland.

KIMBERLEY, formerly called New Rush, one of the mining towns of the diamond district of South Africa, situated in Griqualand West, to the east of the Orange river, 520 miles northeast of Cape Town.

KIMHI. ReDaK, *i.e.*, Rabbi David Kimhi or Kimchi, was born at Narbonne after 1155, and died probably in the same city about 1235.

Although preceded by Hayyúj, Ibn Janáh, and others, and succeeded by Abraham de Balmes, Elias Levita, and others, Kimhi has maintained the position of the greatest Jewish grammarian and lexicographer for 650 years. And, although much inferior as a Biblical scholar and talmudist to Rashi, and as a critic and philosopher to Abraham Ibn Ezra, he has outstripped both in the eyes, not only of the Christians, but to some extent even of the Jews, and thus reigned supreme for more than half a millenium, as a commentator on the Bible.

KIMPULUNG, a town of Roumania, in that part of the country formerly known as Great Wallachia, is situated at the foot of the Transylvanian Alps, on the banks of one of the left-hand tributaries of the Danube, about eighty miles northwest of Bucharest. Its position near the Törzburg pass gives it a considerable share of the trade between Hungary and Roumania. Population, about 9,000.

KINCARDINE, or THE MEARNS, a maritime county in the east of Scotland, is bounded on the east by the German Ocean, on the northwest by Aberdeenshire, and on the southwest by Forfarshire. Its length along the coast from the mouth of the North Esk to that of the Dee is thirty-one miles, and its breadth, east to west, from Dunnottar to Mount Battock, twenty-two miles. The total area is 248,284 acres, or about 381 square miles.

Railways.—The Caledonian Railway traverses the county from Marykirk to the mouth of the Dee, and a branch line runs along the seacoast as far north as Bervie.

Administration.—The county comprises eighteen parishes and three parts of parishes; one royal burgh, Bervie, which received its constitution from David II. in return for the hospitality of the inhabitants when he landed there through stress of weather; and one burgh of barony, Stonehaven, which, since 1600, has been the capital of the county, the former capital, Kincardine, in the parish of Fordoun, at which there was at one time a royal castle, having now declined to the position of a mere hamlet. The county is now joined to the sheriffdom of Aberdeen, weekly courts being held at Stonehaven. One member of parliament is returned for the county, and Bervie is united with the Montrose district of burghs, which returns one member.

The population, by the census of 1901, was 40,918, of whom 20,067 were males and 20,851 were females.

History and Antiquities.—Anciently Kincardine belonged to the district of Pictavia. Cairns and stone circles are frequent in nearly every part of the shire, and there are numerous traces of Roman camps. According to some the county received the name Mearns from having been granted to Mernia, a Scottish king, brother of the Angus who received the neighboring county of Forfar. The only old building of special interest is Dunnottar Castle, near Stonehaven, the old seat of the Keiths, earl marischals of Scotland. The castle stands on a high projecting rock about 150 feet above the sea, by which it is nearly surrounded, and was formerly an extensive fortress of great strength. In the reign of James II. it was used as a prison for Nonconformists. Among the eminent persons connected with Kincardine may be mentioned John of Fordoun the historian, George Wishart, Robert Barclay the Quaker, Bishop Burnet, Dr. John Arbuthnot, Dr. James Beattie, Dr. Thomas Reid, and Lord Monboddo.

KINDERGARTEN, a German word meaning "garden of children," is the name given by Friedrich Froebel (see FROEBEL) to a kind of "play-school" invented by him for furthering the physical, moral, and intellectual growth of children between the ages of three and seven. Froebel's observation of the development of organisms and his fondness for analogies drawn from trees and plants made him attach especial importance to our earliest years, years in which, as he said, lies the tap-root of much of the thought and feeling of after-life. Although the analogies of nature had constantly been referred to before Froebel's days ("First the blade, then the ear, then the full corn in ear"), and Bacon, speaking of education, had said that the gardener bestows the greatest care on the young plants, the Renaissance left the imparting theory of education so firmly fixed on the mind of Europe that for 200 years the developing theory could hardly get a hearing, and little was done to reduce it to practice before the attempt of Pestalozzi. Pestalozzi and other great thinkers (notably Comenius), who attached much importance to the first years of life, looked to the mother as the sole educator. But in the case of the poor the mother might not have time to attend to her children: so toward the end of the last century Pestalozzi planned and Oberlin formed day asylums for young children, the benefit of which was intended no less for the mother than the child. Schools of this kind took in the Netherlands the name of "play-schools," and in England, where they have especially thriven, of "infant schools." But Froebel's idea of the "Kindergarten" differed essentially from that of the infant schools. He maintained that there was something to do for young children which even the ideal mother in the ideal family could not do. The child required to be prepared for society by being early associated with its equals; and young children thus brought together might have their employments, especially their chief employment, play, so organized for them as to draw out their capacities of feeling and thinking, and even of inventing and creating.

Froebel held that the essence of all education was to be found in rightly directed but spontaneous action. So the children must be employed; and at that age their most natural employment is play, especially, as Wordsworth has pointed out, games in which they imitate and "con the parts" they themselves will have to fill in after years. Froebel agreed with Montaigne that the games of children were "their most serious occupations," and with Locke that "all the plays and diversions of children should be directed toward good and useful habits, or else they will introduce ill ones." So he invented a course of occupations, most of which are social games. Many of the games are connected with the "gifts," as he called the series of simple playthings provided for the children, the first being the ball, "the type of unity." The "gifts" are chiefly not mere playthings, but materials which the children work up in their own way, thus gaining scope for their power of doing and inventing and creating. The artistic faculty was much thought of by Froebel, and, as in the education of the ancients, the sense of rhythm in sound and motion was cultivated by music and poetry introduced in the games. Much care was to be given to the training of the senses, especially those of sight, sound, and touch. Intuition of first-hand experience was to be recognized as the true basis of knowledge, and though stories were to be told, and there was to be much intercourse in the way of social chat, instruction of the imparting and "learning-up" kind was to be excluded. Froebel sought to teach the children not what to think, but how to think, in this following in the steps of Pestalozzi, who had done for the child what Bacon nearly two hundred years before had done for the philosopher. Where possible the children were to be much in the open air, and were each to cultivate a little garden.

To judge by all appearances at present date, the kindergarten has become an important institution in the education of children. The first kindergarten was opened at Blankenburg, near Rudolstadt, in 1840, but after a needy existence of eight years was closed for want of funds. In 1851 the Prussian Government declared that "schools founded on Froebel's principle or principles like them could not be allowed." But the idea had far too much vitality to be starved or frowned down. Although its progress has not been rapid, it has been constant. As early as 1854 it was introduced into England by the then famous Ronges; and Henry Barnard reported on it that it was "by far the most original, attractive, and philosophical form of infant development the world has yet seen." But the attempt failed, and though there are now a Froebel Society, an institution for training young women to conduct kindergartens, and also some good kindergartens, Froebel's idea has hardly yet found a home in Britain. The great propagandist of Froebelism, the Baroness Marenholtz-Bülow, drew the attention of the French to the kindergarten from the year 1855, and Michelet declared that Froebel had "solved the problem of human education." In the department of the Seine the "Salles d'Asile" now consist of a class for children from two to four years old, and a "Froebel class" of children from four to six. In Italy the kindergarten has been introduced by Madame Salis-Schwabe, and is used in the education of the poor. In Austria it is recognized and regulated by the government, though the Volks-Kindergärten are not numerous. But by far the greatest developments of the kindergarten system are in the United States and in Belgium. Dr. William T. Harris, assisted by Miss Blow, tried the experiment of making the kindergarten a part of the public education in St. Louis eighteen years ago, and there are now multitudes of children, all over five years of age, in the public kindergartens of almost every city of the Union. In Belgium the mistresses of the "Écoles gardiennes" have for some time been instructed in the "idea of the kindergarten" and "Froebel's method," and in 1880 the minister of public instruction, Van Humbeeck, issued a programme for the "Écoles Gardiennes Communales," which is both in fact and in profession a kindergarten manual. This programme attributes the improvement in infant schools to "le souffle puissant de Froebel;" and, after explaining that the method to be adopted is based on the laws which govern the development of the child, the minister continues: "In its great principles as well as in its main applications this method is that created by the genius of Froebel." This estimate of Froebel's principles contrasts strangely with the Prussian minister's thirty years earlier.

KINEMATICS. See MECHANICS.

KING, WILLIAM, a political and religious writer, and successively bishop of Derry and archbishop of Dublin, was born at Antrim, Ireland, in 1650. He died in 1729.

KING-BIRD, the *Tyrannus carolinensis* or *T. pipiri* of most later writers, a common and characteristic inhabitant of North America, ranging as high as 57° N. latitude, or farther, and westward to the Rocky Mountains, beyond which it goes to Oregon and Washington, as well as to British Columbia, though apparently not occurring in California. In Canada and the northern States of the Union it is a summer visitor, wintering in the south, but also reaching Cuba, and, passing through Central America, it has been found in Bolivia and eastern Peru. Both the scientific and common names of this species are taken from the way in which the cock will at times assume despotic authority over other birds, attacking them furiously as they fly, and forcing them to divert or altogether desist from their course. Yet it is love of his mate or his young that prompts this bellicose behavior, for it is only in the breeding season that he indulges in it; but then, almost every large bird that approaches his nest, from an eagle downward, is assaulted, and those alone that possess greater command of flight can escape from his repeated charges, which are accompanied by loud and shrill cries.

KINGFISHER, Walloon—the *Alcedo ispida* of ornithologists, one of the most beautiful and well-known of European birds, being found, though nowhere very abundantly, in every country of this quarter of the globe, as well as in North Africa and Southwestern Asia as far as Sindh. Its blue-green back and rich chestnut breast render it conspicuous as it frequents the streams and ponds whence it procures its food, by plunging almost perpendicularly into the water, and emerging a moment after with the prey—whether a small fish, a crustacean, or an aquatic insect—it has captured. In hard frosts it resorts to the seashore, but a severe winter is sure to occasion a great mortality in the species, for many of its individuals seem unable to reach the tidal waters where only in such a season they could obtain sustenance; and to this cause rather than any other (though, on account of its beauty and the utility of its feathers in making artificial flies, it is shot and netted in great numbers) is perhaps to be ascribed its general scarcity. Very early in the year it prepares its nest, which is at the end of a tunnel bored by itself in a bank, and therein the six or eight white, glossy, translucent eggs are laid, sometimes on the bare soil, but often on the fishbones which, being indigestible, are thrown up in pellets by the birds; and, in any case, before incubation is completed these *rejectamenta* accumulate so as to form a pretty cup-shaped structure that increases in bulk after the young are hatched, but, mixed with their fluid excretions and with decaying fishes brought for their support, soon becomes a dripping fetid mass.

The Kingfisher is the subject of a variety of legends and superstitions, both classical and mediæval. Of the latter one of the most curious is that having been originally a plain gray bird it acquired its present bright colors by flying toward the sun on its liberation from Noah's ark, when its upper surface assumed the hue of the sky above it and its lower plumage was scorched by the heat of the setting orb to the tint it now bears. More than this, the Kingfisher was supposed to possess many virtues. Its dried body would avert thunderbolts, and if kept in a wardrobe would preserve from moths the woolen stuffs therein laid, or hung by a thread to the ceiling of a chamber would point with its bill to the quarter whence the wind blew.

KINGLET, a name applied in many books to the bird called by Linnæus *Motacilla regulus*, and by most modern ornithologists *Regulus cristatus*, the Golden-crested or Golden-crowned Wren of ordinary persons. This species is the type of a small group which has been generally placed among the *Sylviidæ* or true Warblers, but by certain systematists it is referred to the Titmouse family, *Paridæ*.

KINGS, THE FIRST AND SECOND BOOKS OF, which form the last part of the series of Old Testament histories known as the Earlier Prophets, were originally reckoned as a single book, though modern Hebrew Bibles follow the bipartition which we have derived from the Septuagint. In that version they are called the third and fourth books of kingdoms, the first and second being our books of Samuel. The division into two books is not felicitous, and even the old Hebrew separation between Kings and Samuel must not be taken to mean that the history from the birth of Samuel to the exile was treated by two distinct authors in independent volumes. We cannot speak of the author of Kings or Samuel, but only of an editor or successive editors whose main work was to arrange in a continuous form extracts or abstracts from earlier books. The introduction of a chronological scheme and of a series of editorial comments and additions, chiefly designed to enforce the religious meaning of the history, gives a kind of unity to the book of Kings as we now read it; but beneath this we can still distinguish a variety of documents, which, though sometimes mutilated in the process of piecing them together, retain sufficient individuality of style and color to prove their original independence. Of these documents one of the best defined is the vivid and exact picture of David's court at Jerusalem, of which the first two chapters of 1 Kings are manifestly an integral part. As it would be unreasonable to suppose that the editor of the history of David closed his work abruptly before the death of the king, breaking off in the middle of a valuable memoir which lay before him, this observation leads us to conclude that the books of Samuel and Kings are not independent histories. They have at least one source in common, and a single editorial hand was at work on both. But the division which makes the commencement of Solomon's reign the beginning of a new book is certainly ancient; it must be older than the insertion of the appendix 2 Sam. xxi.–xxiv., which now breaks the continuity of the original history of David's court. From an historical point of view the division is very convenient. The subject of the book of Samuel is the creation of a united Israel by Samuel, Saul, and David. Under Solomon the creative impulse has already died away; the kingship is divorced from the sympathies of the nation; and the way is prepared for the formation of the two kingdoms of Ephraim and Judah, the fortunes of which up to their extinction by the great empires of the East form the main subject of the book of Kings. It is probable, however, that the editor who made the division had another reason for disconnecting Solomon from David and treating his reign as a new departure. The most notable feature in the extant redaction of the book is the strong interest shown in the Deuteronomic "Law of Moses," and especially in the centralization of worship in the temple on Zion as prescribed in Deuteronomy and enforced by Josiah. This interest did not exist in ancient Israel, and is quite foreign to the older memoirs incorporated in the book; amid the great variety in style and manner which marks the several parts of the history it is always expressed in the same stereotyped phrases and unvarying style; in brief, it belongs to the editorial comments, not to the original sources of the history. To the Deuteronomistic editor, then, the foundation of the temple, which is treated as the central event of Solomon's reign, is a religious epoch of prime importance, and on this ground alone he would naturally make Solomon's reign commence a new book—the history of Israel under the one true sanctuary.

KING'S COUNTY, an inland county in the province of Leinster, Ireland, is bounded on the north by Meath and Westmeath, on the west by Roscommon, Galway, and Tipperary, on the south by Tipperary and Queen's county, and on the east by Kildare. It is oblong in shape, but of very irregular outline. Its greatest breadth from north to south is thirty-nine miles, and its greatest length from east to west forty-five miles. The area is 772 sq. miles, and the population (1901), 60,129.

Administration.—The county comprises twelve baronies, forty-two civil parishes and nine parts of parishes, and 1,160 townlands. It contains portions of five poor-law unions, viz., Edenderry, Mountmellick, Parsonstown, Roscrea, and Tullamore. The county includes part of the parliamentary borough of Portarlington (the remainder being in Queen's county), and two townships, Parsonstown and Tullamore. Assizes are held at Tullamore and quarter-sessions at Parsonstown, Philipstown, and Tullamore. King's county is in the Dublin military district, and there are barrack stations at Parsonstown, Banagher, Philipstown, Shannon Bridge, and Tullamore. Previous to the Union, King's county returned six members to parliament, two for the county and two for each of the boroughs of Philipstown and Banagher, but since then only the two county members have been returned.

History.—King's county, with portions of Tipperary, Queen's county, and Kildare, at an early period formed one kingdom under the name of Hy Falgia or Offalia, a title which it retained after the landing of the English. Subsequently it was known as Glenmallery, Western Glenmallery pretty nearly corresponding to the present King's county, and Eastern Glenmallery to Queen's county. The principal septs of the districts were the O'Connors and the O'Carrolls, whose estates and those of the other leading families were forfeited about the middle of the sixteenth century. By a statute of 1557 the western district was constituted a shire under the name of King's county in honor of Philip—the principal town, formerly the seat of the O'Connors, being called Philipstown; and the eastern district at the same time received the name of Queen's county in honor of Mary. The subjugation of King's county was, however, not completely accomplished till about the beginning of the seventeenth century, when the O'Connors and their followers were totally routed and dispersed by Sir Oliver Lambert. After the Cromwellian wars a large number of estates were forfeited on account of the insurrectionary action taken by the leading gentry.

KINGSLEY, Charles, an English clergyman, poet, and novelist, was born on June 12, 1819, at Holne vicarage, Dartmoor, Devon. He was educated at private schools and at King's College, London, after his father's promotion to the rectory of Chelsea. In 1838 he entered Magdalen College, Cambridge, where he took his degree in 1842, first-class in classics, and senior optime in mathematics. In the same year he was ordained to the curacy of Eversley in Hampshire, to the rectory of which he was not long afterward presented, and this was his home for the remaining thirty-three years of his life, although his residence there was much broken by various domestic circumstances as well as, in later years, by promotion to other offices in the church. He died at Eversley, after a short illness, on January 23, 1875.

With the sympathetic organization which made him keenly sensible of the wants of the poor, he threw himself heartily into the movement known as Christian Socialism, of which Mr. Maurice was the recognized leader, and for many years he was considered as an extreme radical in a profession which holds, as a rule, but few such. While in this phase of mind he wrote his novels *Yeast* and *Alton Locke*, in which, though he pointed out unsparingly the folly of extremes, his sympathies were unmistakably shown to be, not only with the poor as in their strife against the rich, but with much that was done and said by the leaders in the Chartist movement. Yet even then he considered that the true leaders of the people were a peer and a dean, and there was no real inconsistency in the fact that at a later period he was among the most strenuous defenders of Governor Eyre in the measures adopted by him to put down the Jamaican disturbances. In politics he might therefore have been described as a Tory aristocrat tempered by sympathy, or as a Radical tempered by hereditary scorn of subject races. The like seeming but not real inconsistencies were to be found in his attitude as a clergyman. He was a man of earnest piety, and lived so near in his own mind to the great realities of the unseen world that he could even afford to speak of serious subjects in a way which in one less reverent than he would have seemed to lack reverence; and, while he held in many respects what would be called a liberal theology, the church, its organization, its creed, its dogma, had ever an increasing hold upon him.

As a preacher he was vivid, eager, and earnest, equally plain-spoken and uncompromising when preaching to a courtly congregation or to his own village poor. As a novelist, his chief power lay in his descriptive faculties. *Yeast* and *Alton Locke* were written out of the heat of strong conviction, and dealt in a brilliant manner with great social questions, but the later novels seem to have been written rather because he wished to say something than because he had something to say, and in spite of new and ever new editions it may be doubted whether the real interest felt in these works is considerable.

KINGSTON, the chief city of Ulster county, N. Y., is situated on the west bank of the Hudson, about ninety miles north of New York. Its harbor is formed by the navigable portion of Rondout Creek. Among the chief buildings are the city hall, the music hall, the almshouses, and the county buildings. Kingston is a very busy shipping center, with four miles of wharfage, and steam and other shipping representing a considerable aggregate tonnage. As the center of the bluestone region, Kingston ships an immense quantity of that mineral; and, possessing the largest cement factory in the country, its out-turn of that material together with bricks, ice, lime, timber, and other goods swells the amount of its exports to upward of 250,000 tons per annum. The manufactures of the town include salt, tobacco, glue, carriages, beer, boats, and brick. The population in 1900 was 24,535.

KINGSTON, the chief city of Frontenac county, Ontario, Canada, is situated at the northeastern extremity of Lake Ontario, at the point where the St. Lawrence issues from it, and at the mouth of the Cataraqui creek, about 160 miles east of Toronto by the Grand Trunk Railway. Kingston is the seat of Queen's university and college, and a medical college affiliated to the university. The Roman Catholic Regiopolis college has been closed since 1869. The royal military college of the Dominion is at Kingston. The harbor is deep, spacious, and sheltered, and brisk trade is carried on. As a naval station Kingston occupies an important position. It commands the entrance to the Rideau Canal, and is strongly fortified. Shipbuilding, iron-founding, and the manufacture of locomotives, steam-engines, and machinery, leather, soap, and candles, boots and shoes, cotton and wooden goods are carried on by the inhabitants. Kingston is the seat of an Anglican and of a Roman Catholic bishop. The population in 1901 was 17,961.

KINGSTON, the capital of Jamaica. See JAMAICA.

KINGSTON-ON-THAMES, a municipal borough and market-town of England, county of Surrey, extends for about a mile and a half along the right bank of the Thames, and is distant from London about twenty miles by the river, and twelve miles by rail and road. The population of the municipal borough in 1881 was 19,875.

KINGSTON-UPON-HULL. See HULL.

KINGSTON, WILLIAM HENRY GILES, boys' novelist, was born in London, February 28, 1814. He died at Willesden, August 5, 1880.

KINGSTOWN, a seaport town of Ireland, in the county of Dublin, is situated at the southeastern extremity of Dublin Bay, six miles southeast from Dublin by railway. Population (1901), 21,000.

KING-TIH CHIN, a town near Foo-leang Heen in the province of Keang-se, China, and the principal seat of the porcelain manufacture in that empire.

KINO, an astringent drug introduced into European medicine in 1757 by Fothergill, an eminent physician and patron of economic botany.

The drug which is at present recognized as the legitimate kind is East Indian, Malabar, or Amboyna kino, and is obtained from *Pterocarpus Marsupium*, Roxb. (*Leguminosæ*). It is collected in the government forests of the Malabar coast, the collectors being required to pay a small fee for the privilege, and to perform the tapping carefully and without injuring the timber. The mode of obtaining the kino is by making a perpendicular incision, with lateral ones leading into it, in the trunk, a vessel being placed at the foot of the incision to receive the juice. When exuding it resembles red currant jelly, but hardens in a few hours after exposure to the air and sun. When sufficiently dried it is packed into wooden boxes for exportation. When these are opened it breaks up into angular brittle fragments of a blackish-red color and shining surface.

Kino is used in medicine as an astringent, chiefly in the form of tincture; but, owing to its tendency to gelatinize, that preparation is much less used than formerly.

KINROSS, a small inland county of Scotland. It is of an irregular circular form, and in outline somewhat resembles a toothed wheel, lying between Perthshire on the northwest and Fife on the southeast. Its breadth from west to east is about twelve miles, and its length from north to south is about ten miles; the area is 49,812 acres, or about eighty-two square miles. Next to Clackmannan it is the smallest county in Scotland. Population (1901), 6,980.

KINSALE, a parliamentary borough and seaport town of Ireland, in the county of Cork, is situated on the estuary of the Bandon, twenty-four miles south from Cork by rail. Population, 5,306.

KIÔTO, KIYÔTO, MIAKO, or SAIKIO, the ancient sacred capital of Japan, is situated on the main island of the Japanese archipelago. It occupies the level bottom of a valley between the ridges Hujei-zan and Higushiyama on the east, and of Tenno-san on the west, and is so girt by the streams Kamogawa and Kalunagawa as to have an almost insular position. With Tôkiô to the northeast, it is connected by two highways, the Tôkaidô, 307 miles long, and the Nakasendô, 323 miles long. To Ôzaka on the coast a railway line was opened in 1877. Kiôto is regularly and compactly built on the rectangular system, the immense number of Shintô and Buddhist shrines and temples being almost entirely beyond the city proper. The large suburb beyond the Kamogawa, which is crossed by many bridges, is the finest in respect of inns and temples. The houses, chiefly of wood, are small, and are further dwarfed by the great width of the streets. Tea-houses and pleasure gardens abound, and the whole air of the city is pleasant. The population in 1899 was estimated at 353,139.

KIPPIS, ANDREW, a learned and laborious compiler, was born at Nottingham March 28, 1725. He died in 1795.

KIRBY, WILLIAM, entomologist, was born at Witnesham in Suffolk, England, September 19, 1759. On July 4, 1850, William Kirby died, after a long life of piety, benevolence, and diligence. He was an original member of the Linnæan Society; and his name was on the rolls of all the chief scientific associations in England and abroad.

KIRCHER, ATHANASIUS, a learned scholar and accomplished mathematician, was born May 2, 1602, at Geisa near Fulda. He died November 28, 1680.

KIRCHHEIM-UNTER-TECK, chief town of a district in the Danube circle of Würtemberg, is prettily situated on the Lauler, not far from the Teck, and about fifteen miles southeast of Stuttgart.

KIRGHIZ, a large and widespread division of the Mongolo-Tartar family, of which there are two main branches, the Kara-Kirghiz of the uplands and the Kirghiz-Kazaks of the steppe. To the same group belong the Kipchaks, forming a connecting link between the nomad and settled Turki peoples of Ferghana and Bokhara, and the Kara-Kalpaks on the southeast side of the Aral Sea, who are intermediate between the Kazaks and Uzbegs. The Kirghiz jointly number about 3,000,000, and occupy an area of perhaps the same number of square miles, stretching from Kulja westward to the lower Volga, and from the head streams of the Ob southward to the Pamir and the Turkoman country.

KIRIN, GIRIN, or in Chinese CHWEN-CHANG, the chief town of the province of Central Manchuria or Kirin, is situated at the foot of the Lau-Ye-Ling mountains, at the edge of a wide and well-wooded plain, and on the left bank of the Girin-ula or Sungari, there 300 yards in breadth. The situation is one of exceptional beauty; but the streets are narrow and irregular. Tobacco is the principal article of trade, the kind grown in the province being greatly prized throughout the Chinese empire under the name of "Manchu leaf." The population was estimated at 300,000 in 1812; at present it is about 120,000.

KIRKCALDY, a royal and parliamentary burgh and seaport on the southeast coast of Fifeshire, Scotland, twelve miles north from Edinburgh.

Adam Smith, whose great work, *The Wealth of Nations*, formed an era in the history of political economy; James Oswald of Dunnikier, a schoolfellow of Adam Smith, and a statesman of much promise; George Gillespie, a leading member of the Westminster Assembly; and Balnaves of Halhill, a lord of session in the time of Queen Mary, were natives of Kirkcaldy. Michael Scot, of wizard fame, was born about a mile from the burgh boundary. Population (1901), about 27,000.

KIRKCUDBRIGHT, a maritime county of Scotland, known as the "Stewartry of Kirkcudbright," and also as East Galloway, is bounded on the north and northwest by Ayr, east and northeast by Dumfries, south by the Solway Firth and the Irish Sea, and west by Wigtownshire and Wigtown Bay. Its extreme length from northwest to southeast is about forty-five miles, and its breadth varies from twenty-one to thirty-one miles. The total area comprises 610,343 acres, or about 899 square miles. Population (1901), 39,407.

The total number of horses in 1881 was 5,395. The breeding of Clydesdale horses has of late years been increasing. Cattle in 1881 numbered 40,737.

The principal ports are Kirkcudbright, Creetown and Gatehouse. Linen, woolen, and cotton goods are manufactured in the towns and villages, and there are also breweries, distilleries, tanneries, and paper-mills.

KÍRKÍ, or Kirkee, a town and military cantonment in Poona district, Bombay, India.

KIRKINTILLOCH, a burgh of barony and market-town of Dumbartonshire, Scotland, about seven miles north of Glasgow. Population (1901), about 12,000.

KIRK-KILISSIA, or Kirk-Kilisseh, a town in the vilayet of Adrianople, Turkey, is situated on a feeder of the Erkene, which is an affluent of the Maritza, about thirty-five miles east of Adrianople. The population is estimated at about 16,000.

KIRKWALL, a royal and parliamentary burgh of Scotland, and the chief town of the Orkney Islands, is situated near the center of the island group, at the southeast corner of a well-sheltered bay on the east side of the island of Pomona, 240 miles north of Edinburgh by steamer, fifty-eight north of Wick, and fifty-four north of Thurso. Population (1901), 4,000.

KIRMÁN, the ancient Karmania, a province of south Persia, bounded on the east by Sistán and Balúchistán, on the west by Farsistán, north by Khórásán, on the south by Láristán, Makrán, and the Strait of Ormuz. It is of very irregular shape, expanding in the north toward Khorásán, and gradually contracting in the south to the narrow coast district of Mogistan; the extreme length between Sistaán and Fars east and west is 400 miles; the greatest breadth from south of Yezd to the coast at Bandar-Abbas is 300 miles; and the total area is estimated at 55,000 to 60,000 square miles. The chief towns are Kirmán (the capital), Regan, Kruk, Kúm, Bam, Khabís, Khánú, and Bander-Abbas.

KIRMANSHÁHÁN, or Kermanshah (Arabic, *Karmísín*), a town and district of west Persia, lying between Ardelán and Lúristán north and south. The town is the chief place in what is known as Persian Kúrdistán, an expression, however, which has no administrative significance. It occupies an important strategical position near the right bank of the river Kernah, 250 miles southwest of Tehrán, 262 northwest of Ispahán, 220 northeast of Bagdad, and 280 south of Tabriz.

KIRRIEMUIR, a burgh of barony and market-town of Forfarshire, Scotland, is beautifully situated on an eminence, above the glen through which the Gairie flows.

KIRSANOFF, a town of Russia, in the government of Tamboff, sixty-one miles east of the government town, near the junction of the Pursavka with the Vorona, with a station on the railway between Saratoff and Kozloff.

KISFALUDY, Karoly or Charles, a poet of Hungary, and especially celebrated as the regenerator of the national drama, was born on February 6, 1788, at Tét, in the county of Györ. In 1799 he was sent to the gymnasium at Györ (Raab), where he made only moderate progress in his studies, while the impetuosity of his disposition often involved him in trouble. Placed as a cadet in Duke Eszterházy's regiment in 1804, he saw a good deal of service, rising to the rank of captain. In 1811 he quitted the army with the intention of marrying. Offended at this step, his father withdrew from him all support, and his affianced bride rejected him upon finding him at variance with his father. His sister, then the wife of Captain Gábor Farkas, offered him an asylum in her home, where he remained during the winter of 1811–12; but, unwilling to eat the bread of dependence, Károly removed to Pest and afterward to Vienna, where he tried to live by his skill in painting. He at this time began assiduously to study the works of Shakespeare, Schiller, and Lessing, became a frequent visitor at the Vienna theater, and made the acquaintance of its official poet, Theodore Körner, whose drama, *Zrinyi*, was written at Kisfaludy's suggestion. Rendered impatient by ill success, he soon left Vienna, and for over four years wandered, mostly on foot, through Germany, Switzerland, France, and Italy as far as Rome, obtaining as before a precarious livelihood as an artist. Although not without friends at Pest, where he now took up his abode, he continued to support himself by his brush until the spring of 1819. In 1822 he started an annual under the name of *Aurora*, which he continued to edit until the year of his death. In recognition of his exceptional literary merit, he was in 1826 rewarded with the prize of the Marczibányi foundation. Consumption, accelerated by the news of his sister's death, brought his career to a close on November 21, 1830, at the early age of forty-two, while his friends were rejoicing at the tidings of his election as a member of the Hungarian academy of sciences.

KISFALUDY, Sándor or Alexander, elder brother of Károly Kisfaludy, whom he excels as a lyric poet though not as a dramatist, was born on September 27, 1772, at Sümeg, Zala, Hungary, entered the army in 1793, and was appointed to a lieutenancy in the Hungarian life guards at Vienna. There he employed his spare time in literary pursuits, and especially in the study of Italian poets. Upon the death of his patron Prince Anton Eszterházy, Kisfaludy was sent back to Hungary. During the Italian campaign of 1796 Kisfaludy was stationed at Milan, and upon the surrender of that city he was sent as a prisoner of war to Vaucluse, where he began to write the series of love sonnets for which he afterward became so famous, and which were suggested to his mind by the songs of Petrarch. After his release at the peace of Campo Formio (October 17, 1797), Kisfaludy was posted as captain in a regiment quartered at Würtemberg, and in 1799 he took part in the battles of Stockach, Winterthur, and Zürich. In 1800 he left the army, and stayed for five years at Kám, in the county of Vas, subsequently removing to his native place, Sümeg, where he devoted himself to agricultural and literary pursuits. By this time Kisfaludy had gained the highest reputation as a lyric poet by his *Loves of Himfy*, the first part of which, published anonymously at Buda in 1801, was received with such applause as had never before been accorded to any Magyar work. The second part appeared under his own name in 1807. On the "insurrectio," or general rising of the Hungarian nobles against Napoleon, in 1809, Kisfaludy accepted the post of major of cavalry, and was also nominated by the palatine one of his adjutants. After his return to private life Kisfaludy wrote several dramatic pieces, and from 1820 contributed largely to his brother's annual *Aurora*. In 1818 he gained the Marczibányi prize for his *Ballads*, which work was translated into German by Gaal; and in 1831 he was elected member of the Hungarian academy of sciences, in the formation of which he had taken an active part. He died on October 28, 1844, at the age of seventy-two.

KÍSH, or KAIS (the first form is Persian and the second Arabic), an island in the Persian Gulf, which rose to importance in the twelfth and thirteenth centuries, and flourished on the fall of Síráf as a chief station of the Indian trade with the West. Edrísí in the twelfth century describes it as the capital of a pirate chief who had acquired great wealth and power, and ravaged the coasts far and wide.

KISHANGARH, or KRISHNAGARH, a native state in Rájputána, India, with an area of about 724 square miles, and an estimated population of 105,000.

KISHINEFF, the Kishlanow of the Moldavians, a town of Russia, capital of the province of Bessarabia, on the right bank of the Byk, a tributary of the Dniester, situated on the railway between Odessa and Jassy in Roumania, 118 miles northwest from the former. At the beginning of this century it was but a poor village, and in 1812, when it was acquired by Russia from Moldavia, it had but 7,000 inhabitants; twenty years later its population numbered 35,000, while in 1899 its population was 108,796, composed of the most varied nationalities — Moldavians, Wallachs, Russians, Jews, Bulgarians, Tartars, Germans and Tsigans.

KISHM, or TAWÍLAH (*i.e.*, Long Island), an island at the mouth of the Persian Gulf, separated from the coast of the Persian province of Kirmán by Clarence Strait, which at its narrowest point has a breadth of less than two miles. The island has a length of about fifty-five miles, its main axis running northeast and southwest; and the area is estimated at 640 square miles. Kishm, the largest of the towns, lies at the eastern extremity of the island; Bassidore, the next in importance, at the western extremity; and Láfit (Luft, Leit) about midway along the northern coast. The town of Leit was reduced by a British fleet in 1809. Politically the island belongs to Persia, but the shah has long farmed it to the sultan of Muscat. The inhabitants are reckoned at 5,000 or 6,000.

KISSINGEN, the chief town of a department in the government district of Lower Franconia and Aschaffenburg, Bavaria, is situated on the Franconian Saale, 656 feet above sea-level, and about sixty-two miles east of Frankfort-on-the-Main.

The salt springs were known in the ninth century, and their medicinal properties were recognized in the sixteenth, but it was only within the first half of the nineteenth century that Kissingen became a popular resort. On July 10, 1866, the Prussians defeated the Bavarians with great slaughter near Kissingen. The town was the scene of the attempted assassination of Prince Bismarck by Kullman, July 13, 1874. Population, 4,000.

KISTNA, or KRISHNA, a district in the Madras Presidency, India, is, speaking generally, a flat country, but the interior is broken by a few low hills, the highest being 1,857 feet above sea-level. The principal rivers are the Kistna, which cuts the district into two portions known as the Masulipatam and Gantúr divisions, and the Munyeru, Paleru, and Naguleru (tributaries of the Gundlakamma and the Kistna); the last only is navigable. The Kolar Lake, which covers an area of twenty-one by fourteen miles, and the Romparu swamp are natural receptacles for the drainage on the north and south sides of the Kistna respectively.

A recent census returned the population of Kistna district at 1,452,370 (1,373,089 Hindus, 78,937 Mohammedans, 90 Europeans, 218 Eurasians, and 36 "others"). As a whole the people are poor, except in the fertile Godávari delta. The cultivated area, exclusive of *Zamindári* estates, in 1875–76, was returned at 1,907,213 acres, cultivable but not under tillage 981,377 acres, and waste 1,215,853 acres. The principal agricultural products are rice, maize, *rágí*, pulses, hemp, flax, cotton, tobacco, gingelly, oil-seeds, chillies, wheat, garlic, indigo.

KISTNA, or KRISHNA, a large river of southern India, stretching almost across the entire peninsula from west to east. It rises near the Bombay sanitarium of Mahábaleshwar in the Western Ghats, only about forty miles from the Arabian Sea. Its source is held sacred, and is frequented by pilgrims in large numbers. From Mahábaleshwar the Kistna runs southward in a rapid course into the Nizám's dominions, then turns to the east, and ultimately falls into the sea by two principal mouths.

KIT-CAT CLUB, a convivial association of Whig wits, painters, politicians, and men of letters, founded in the reign of James II.

KITE, the *Milvus ictinus* of modern ornithologists, once, perhaps, the most familiar bird of prey in Great Britain, and now one of the rarest. Three or four hundred years ago foreigners were struck with its abundance in the streets of London, of which it was doubtless the scavenger in ordinary.

The Kite is, according to its sex, from twenty-five to twenty-seven inches in length, about one-half of which is made up by its deeply-forked tail, capable of great expansion, and, therefore, a powerful rudder, enabling the bird, while soaring on its wide wings, more than five feet in extent, to direct its circling course with scarcely a movement that is apparent to the spectator below. Its general color is pale reddish-brown or cinnamon, the head being grayish-white, but almost each feather has the shaft dark. The tail feathers are broad, of a light red, barred with deep brown, and furnish the salmon-fisher with one of the choicest materials of his "flies." The nest, nearly always built in the crotch of a large tree, is formed of sticks intermixed with many strange substances collected as chance may offer, but among them rags seem always to have a place. The eggs, three or four in number, are of a dull white, spotted and blotched with several shades of brown, and often of lilac. It is especially mentioned by old authors that in Great Britain the Kite was resident throughout the year; whereas, on the Continent, it is one of the most regular and marked migrants, stretching its wings toward the south in autumn, wintering in Africa, and returning in spring to the land of its birth.

KITTO, JOHN, the author of various works connected with Biblical literature, was the son of a mason at Plymouth, where he was born, December 4, 1804. In childhood he was weak and sickly, and by a fall sustained while assisting his father in his trade, he received severe general injuries and lost permanently the sense of hearing. No longer able to support himself by manual labor, he endeavored to do so by preparing rude drawings and colored cards in large capital letters, but at last, in November, 1819, he found it necessary to seek refuge in the workhouse, where he was employed making shoes. In 1821 he was bound apprentice to a shoemaker in Plymouth, who, however, treated him with such oppressive tyranny that he appealed to the magistrates, and got his indentures canceled, upon which he again obtained admission to the workhouse. After preparing a small volume of miscellanies, which was published by subscription, he became a pupil of Mr. Groves, a dentist in Exeter, and in this art rapidly acquired proficiency. Through the same gentleman he, in 1825, obtained more congenial employment in the printing-office of the Church Missionary Society at Islington, from which he was, after two years, transferred to the same society's establishment at Malta. There he remained only six months, but, shortly after his return to England, he accompanied Mr. Groves in the capacity of tutor to his two sons on a Christian mission to Bagdad, where he obtained that personal knowledge of Oriental life and habits which he afterward applied with such tact and skill in the illustration of Biblical scenes and incidents. On account of the ravages of the plague, the missionary establishment was broken up, and, in 1832, Kitto returned to England. On arriving in London, he was engaged in the preparation of various serial publications of the Society for the Diffusion of Useful Knowledge, the most important of which were the *Pictorial History of Palestine* and the *Pictorial Bible*. Henceforth his life was one of congenial but incessant literary labor. The *Cyclopædia of Biblical Literature*, edited under his superintendence, appeared in two volumes, 1843-45, and has passed through three editions; and his *Daily Bible Illustrations* still retain a wide popularity among general readers. In the autumn of 1854 he removed, with his family, to Cannstatt, on the Neckar, where, on November 25th, he was seized with an attack which, in a few hours, proved fatal.

KITZINGEN, a town in the government district of Lower Franconia and Aschaffenburg, Bavaria, is situated on the Main, ninety-five miles southeast of Frankfort by rail. Population, 7,000.

KIUNG-CHOU-FOO. See Hainan.

KIWI, or Kiwi-Kiwi, the Maori name of one of the most characteristic forms of New Zealand birds, the *Apteryx* of scientific writers. This remarkable bird was unknown till Shaw, as almost his latest labor, very fairly described and figured it in 1813, from a specimen brought to him from the southern coast of that country by Captain Barcley of the ship *Providence*.

The Kiwis form a group of the subclass *Ratitæ* to which the rank of an order may fitly be assigned, as they differ in many important particulars from any of the other existing forms of Ratite birds. The most obvious feature the *Apteryges* afford is the presence of a back toe, while the extremely aborted condition of the wings, the position of the nostrils—almost at the tip of the maxilla—and the absence of an after-shaft in the feathers, are characters nearly as manifest, and others not less determinative though more recondite will be found on examination. The Kiwis are peculiar to New Zealand, and it is believed that *A. mantelli* is the representative in the North Island of the southern *A. australis*, both being of a dark reddish-brown, longitudinally striped with light yellowish-brown, while *A. oweni*, of a light grayish-brown transversely barred with black, is said to occur in both islands. About the size of a large domestic fowl, they are birds of nocturnal habit, sleeping, or at least inactive, by day, feeding mostly on earthworms, but occasionally swallowing berries, though in captivity they will eat flesh suitably minced.

KIZLIAR, Kizlyar, or Kizlar, a town of Russia, in the government of Stavropol, 325 miles east of the government town, in the low-lying delta of the river Terek, about thirty-five miles from the shores of the Caspian. Population about 10,000.

KLADNO, a mining town in the district of Smichov, Bohemia, lies about fifteen miles west-northwest of Prague. The importance of the town is mainly due to the wealth of its iron-mines and coalfields, which afford employment for some three thousand men. The average annual yield of iron is from 25,000 to 300,000 tons, and of coal 300,000 tons. Population, 14,085.

KLAGENFURT, capital of the duchy of Carinthia, Austria, and seat of the provincial administration, financial direction, and court of appeal, is situated upon a plain at an elevation of 1,450 feet above the sea-level, and about forty miles north-northwest of Laibach, with which, as with Vienna, Gratz, Innsbruck, and other centers, it is connected by railway. The civil population is 16,592; with the military, 18,749.

KLAPROTH, Heinrich Julius von (1783-1835), one of the founders of Oriental scholarship in Europe, was born at Berlin.

KLATTAU, chief town of a district of the same name in Bohemia, lies about seventy miles southwest of Prague. Population about 10,000.

KLAUSENBURG, or Clausenburg (Hungarian, *Kolozsvár;*) a royal free town of Hungary, the capital of the county of Kolozs, and also of the whole Transylvanian circle, is situated in a picturesque valley on the banks of the Little Szamos, and on the Hungarian eastern railway, seventy-two miles north-northwest of Hermannstadt. Klausenburg is the seat of a Unitarian bishop, of the superintendent of the Calvinists for the Transylvanian circle, of a royal court of justice, of a chamber of commerce, and of the county administration, as also the headquarters of the *honvéd* (militia) and regular infantry regiments of the military district. The civil population amounts to 29,929 (with military 30,869); by far the greater majority Magyars by nationality, the remainder being composed of Roumanians, Germans, Armenians, and Jews. Outside the town, upon the slope of the citadel hill, there is a Gipsy quarter.

KLAUSTHAL, or Clausthal, in the circle of Zellerfeld and the district of Hildesheim, Prussia, is the chief town and mining center of the Upper Harz. The men of the town are mainly employed in the neighboring mines and smelting works; of the latter the most important is the Frankenscharner smelting house, where American as well as German ore is worked. The population in 1898 was 8,539; including Zellerfeld, it was 12,799.

KLÉBER, Jean Baptiste, was born at Strasburg in 1753 or 1754. He was meant to be an architect, but his opportune assistance to two German nobles in a tavern brawl obtained for him a nomination to the military school of Munich. He soon obtained a commission, but resigned it in 1783 on finding his humble birth in the way of his promotion. On returning to France he was appointed inspector of public buildings at Belfort, where he studied fortification and military science. In 1792 he enlisted in the Haut-Rhin volunteers, and was from his military knowledge at once elected adjutant. At the siege of Mainz under Merlin de Thionville, he so distinguished himself that he was made general of brigade in July, 1793. In that capacity he commanded in the Vendean war, and was instrumental in winning the victories of Torfou, Chollet, Le Mans, and Savenay. For openly expressing his opinion that lenient measures ought to be pursued toward the Vendeans he was recalled; but in April, 1794, he was made general of division, and sent to the army of the North. Under Jourdan he commanded the left wing at Fleurus, June 26, 1794, and Aldenhaven, October 2, and took Maestricht after a short siege on November 8. During the winter of 1794–95 he besieged Mainz, and on June 4, 1796, gained the victory of Altenkirchen over the prince of Würtemberg. Kléber now considered he had a fair claim to a command in chief, and, not receiving one in the spring of 1797, he resigned his division in disgust, and retired to Paris. There he allied himself with the reactionary party, and according to Mathieu Dumas even offered to command any forces that could be raised against the coup d'état of Fructidor, 1797, but there were no forces to command. He accepted a division in the expedition to Egypt, under Bonaparte, but was wounded in the head at Alexandria in the very first engagement, which prevented his taking any further part in the campaign of the Pyramids, and caused him to be appointed governor of Alexandria. In the Syrian campaign of 1799, he commanded the vanguard, took El-Arish, Gaza, and Jaffa, and bore the brunt of the battle of Mount Tabor, April 15, 1799. Being left by Bonaparte in command of the army in Egypt, he made the convention of El-Arish, and, when Lord Keith refused to ratify the terms, attacked the Turks at Heliopolis, though with but 10,000 men against 60,000, and utterly defeated them on March 20, 1800. He then retook Cairo, which had revolted from the French, and was assassinated there by a fanatic on June 14, 1800, the very day on which Desaix fell at Marengo.

KLEIN, Julius Leopold (1804–1876), a German writer of Jewish origin, was born at Miscolcz, in Hungary. He is chiefly known as the author of an elaborate *Geschichte des Dramas* (1865–1876), in which he undertook to record the history of the drama both in ancient and in modern times.

KLINTZY, a town in Russia, situated in the government of Tchernigoff, 203 miles northeast of the capital of the province. Population, 8,000.

KLOPSTOCK, Friedrich Gottlieb, German poet, was born at Quedlinburg on July 2, 1724. He was educated partly at the gymnasium of his native town, partly at Schulpforta. After studying theology for a short time at Jena, he went in 1746 to the university of Leipsic, where he made the acquaintance of Cramer, Schlegel, Rabener, and other young men of letters, who were conducting the *Bremische Beitrgäe*. At Schulpforta Klopstock resolved to write a great epic. His original intention was to make Henry the Fowler his hero, but this was soon abandoned in favor of the scheme to which he devoted the best years of his life. The first three cantos of *The Messiah*, which were planned in prose in Jena, he finished in Leipsic; and they were published anonymously in the *Bremische Beitärge* in 1748. The name of the author was soon known, and Klopstock suddenly found himself the most popular poet of his generation. In 1748 he accepted the position of tutor to a private family in Langensalza, and in 1750 he went to Zürich, whither he was invited by Bodmer, the translator of *Paradise Lost*, who had been deeply impressed by the early cantos of *The Messiah*. In Zürich Klopstock received from Frederick V. of Denmark, on the recommendation of his minister Count Bernstorff, an invitation to settle in Copenhagen with a pension of 400 thalers. The invitation was accepted. In 1771 Klopstock left Copenhagen, and followed his friend Count Bernstorff to Hamburg, where, in 1773, he issued the last five cantos of *The Messiah*. After spending a year at the court of the margrave of Baden in Carlsruhe, he returned to Hamburg with the title of hofrath and a pension, which he retained along with the pension of the king of Denmark. During the rest of his life he remained in Hamburg, where, in 1792, he married Johanna Elizabeth von Winthem, a widow who had been for many years one of his most intimate friends. He died on March 14, 1803.

KLOSTERNEUBURG, a town in the official district of Hernals, Austria, is situated on the right bank of the Danube, five and one-half miles northwest of Vienna. In Roman times the castle of Citium stood in the region of Klosterneuburg. The town was founded by Charlemagne. It has a population of 8,000.

KNARESBOROUGH, a market-town and parliamentary borough in the West Riding of Yorkshire, seventeen miles west by north of York and 207 north of London. Population, 6,000.

KNELLER, Sir Godfrey, a portrait painter whose celebrity belongs chiefly to England, was born in Lübeck in the duchy of Holstein, August 8, 1648. Showing a marked preference for the fine arts, he studied in the school of Rembrandt, and under Ferdinand Bol in Amsterdam. In 1672 he removed to Italy, directing his chief attention to Titian and the Caracci; Carlo Maratti gave him some guidance and encouragement. In Rome, and more especially in Venice, Kneller earned considerable reputation, by historical paintings as well as portraits. He next went to Hamburg, painting with still increasing success. In 1674 he betook himself to England at the invitation of the duke of Monmouth, was introduced to Charles II., and painted that sovereign, much to his satisfaction, several times. Charles also sent him to Paris, to take the portrait of Louis XIV. When Lely died in 1680, Kneller, who produced in England little or nothing in the historical department, remained without a rival in the ranks of portrait painting. Charles appointed him court painter; and he continued to hold the same post into the days of George I. Under William III. (1692) he was made a knight, under George I. (1715) a baronet, and by order of the emperor Leopold I. a knight of the Roman Empire. He died November 7, 1723.

KNIGHT, Charles, publisher and author, was the son of a bookseller and printer at Windsor, England, where he was born March 15, 1791. After acquiring some knowledge of Latin and French at a common day-school, he was sent at the age of twelve to the classical school of Doctor Nicholas, of Ealing. There, according to his own account, he imbibed such a tincture of learning as made him desirous to be a scholar; and it was very much in opposition to his wishes that in 1805 he was withdrawn from school to be bound apprentice to his father. In editing *The Windsor and Eton Express*, commenced by his father in 1812, some gratification was afforded to his literary ambition, and this received additional stimulus when he became the publisher of *The Etonian*, edited by Praed, with Macaulay, Moultrie, and Derwent and Nelson Coleridge as principal contributors. After editing *The Guardian* from 1820 to 1822, Knight was induced by the Etonians already mentioned, now undergraduates at Cambridge, to set up in business at Pall Mall East, and to become for them editor of *Knight's Quarterly Magazine*. As far as the magazine was concerned the venture was unsuccessful, for it was brought to a close with its sixth number, but it initiated for Knight a literary career as publisher and author which extended over forty years, and the unselfish enterprise of which conferred lasting intellectual benefit on the general mass of his fellow countrymen. In 1827 Knight became the superintendent of the publications of the Society for the Diffusion of Useful Knowledge, for whom he projected and edited *The British Almanac and Companion*, commenced in 1828. In 1829 he began the publication of *The Library of Entertaining Knowledge*, writing several volumes of the series. 1832 and 1833 saw respectively the commencement of *The Penny Magazine* and *The Penny Cyclopædia*, two literary ventures which so far as circulation was concerned were highly satisfactory in their results, but the latter of which, on account of the heavy excise duty, was completed at a great pecuniary sacrifice. Besides a considerable number of illustrated editions of other standard works, Knight completed in 1842 *The Pictorial Shakespeare*, which, although now superseded in regard to critical scholarship, is still valued for the research and taste displayed in its illustrations. *The Pictorial Shakespeare* was followed by various other editions of the same author. The energy of Knight also found scope in the compilation of a variety of illustrated series, such as *Old England* and *The Land We Live In*. In 1853 he became editor of *The English Cyclopædia*, and conjointly with the multifarious duties of such an office he was also engaged in writing his *Popular History of England*, published in eight volumes, 1854-61. In 1864 he withdrew from the business of publisher, but he continued his active literary career nearly to the close of his long life, publishing *The Shadows of the Old Booksellers* (1865), an autobiography under the title *Passages of a Working Life During Half a Century* (3 vols., 1864-65), an historical novel *Begg'd at Court* (1868), and subsequently various papers in *The British Almanac and Companion*. He died at Addlestone, Surrey, March 9, 1873.

KNIGHTHOOD and CHIVALRY are two words which are nearly but not quite synonymous; that is, they may often, although they cannot always, be used precisely in the same way and exactly in the same sense. What we mean by the order of knighthood is to all intents and purposes what we mean by the order of chivalry. But in some of the more special applications of the several terms diversities in their respective significations manifest themselves. We could not, for example, say of anybody that he had received the honor of chivalry, or that he had lived in the age of knighthood. Again, we should speak of lands as held in chivalry not in knighthood, and of the rank or degree of knighthood, not of chivalry. But taken together the two words knighthood and chivalry designate a single subject of inquiry, which presents itself under three different although connected and in a measure intermingled aspects. It may be regarded in the first place as a mode or variety of feudal tenure, in the second place as a personal attribute or dignity, and in the third place as a scheme of manners or social arrangements. It is under these three general aspects that the subject is to be dealt with here. For the more important religious as distinguished from the military orders of knighthood or chivalry the reader is referred to the headings ST. JOHN (KNIGHTS OF), TEUTONIC KNIGHTS, and TEMPLARS.

Our words *knight* and *knighthood* are merely the modern forms of the Anglo-Saxon or Old English *cniht* and *cnihthád*. Of these the primary signification of the first was a boy or youth, and of the second that period of life which intervenes between childhood and manhood. But some time before the middle of the twelfth century they had acquired the meaning they still retain of the French *chevalier* and *chevalerie*. In a secondary sense *cniht* meant a servant or attendant answering to the German *Knecht*, and in the Anglo-Saxon Gospels a disciple is described as a *leorning cniht*. In a tertiary sense the word appears to have been occasionally employed as equivalent to the Latin *miles*—usually translated by *thegn*—which in the earlier Middle Ages was used as the designation of the domestic as well as of the martial officers or retainers of sovereigns and princes or great personages.

Concerning the origin of knighthood or chivalry as it existed in the Middle Ages—implying as it did a formal assumption of and initiation into the profession of arms—nothing beyond more or less probable conjecture is possible. The mediæval knights had nothing to do in the way of derivation with the "equites" of Rome, the knights of King Arthur's Round Table, or the Paladins of Charlemagne.

In one sense tenure in chivalry was practically coextensive with European feudalism, while in another sense it was strictly speaking peculiar to England after the Norman Conquest, and Ireland after the English Conquest. We have no earlier information of the details of the feudal organization of Normandy than we have of the feudal organization of England, and therefore it is impossible to say how far the second was copied from the first, or the first assimilated to the second.

All tenure in chivalry was founded on homage and fealty, to which was added the various services and liabilities under which the different fiefs or tenements were held. Homage consisted in the mutual acknowledgment by the lord and tenant that the latter was the vassal or man of the former, accompanied as evidence thereof by certain solemn acts of obeisance on the one hand and of acceptance and patronage on the other. Hence homage could be only by the tenant in person to the lord in person. Connected with and following on homage was fealty, which was an undertaking or oath on the part of the tenant that he would be true and faithful to his lord in consideration of the lands which he held of him, and that he would duly and fully observe the several conditions of his tenure, which declaration might be received on behalf of the lord by anybody whom he might appoint for the purpose. Every tenant in chivalry owed service to his lord in peace as well as in war, and was bound to attend him in his court not less than in the field. The civil obligations of tenants by knight-service were to assist their lords in the administration of justice and to support them on occasions of ceremony and display. The chief vassals of the king, the earls and barons, were the homagers and peers of the great court-baron of the kingdom, and in turn their under-tenants were the homagers and peers of their palatine and baronial courts. The military obligations of tenants by knight-service were discharged either in the king's armies or in the castles of the king and his principal feudatories. In the first case the holder of a knight's fee was bound to serve in the royal host fully equipped and on horseback at his own expense for forty days in every year when called upon—a tenant in chief serving under the direct command of the sovereign or his officers, and an under, tenant in the martial retinue of his immediate lord. But in the second place the duties of the tenant were not defined by any general rule or custom, and the terms of his service of "castle guard" depended on the special stipulations of his grant or feoffment. Besides all this, however, tenants by knight-service were subjected to various other burdens which in course of time became the most important incidents of their tenure. On the death of a tenant, his heir, if he was of full age, was compelled on taking up his inheritance to pay a fine to his lord. The tenant was also liable to render what were called aids to his lord for three purposes, namely, to ransom him from captivity, to make his eldest son a knight, and to provide a portion for his eldest daughter on her marriage. Of these three aids ransom was only a very rare and exceptional demand, while those "pur faire fitz chivaler" and "pur file marier" were of course of frequent and ordinary occurrence.

Regarded as a method of military organization, the feudal system of tenures was always far better adapted to the purposes of defensive than of offensive warfare. Against invasion it furnished a permanent provision both in men-at-arms and strongholds; nor was it unsuited for the campaigns of neighboring counts and barons which lasted for only a few weeks, and extended over only a few leagues. But when kings and kingdoms were in conflict, and distant and prolonged expeditions became necessary, it was speedily discovered that the unassisted resources of feudalism were altogether inadequate. The barons and knights who fought on horseback were in their own country attended by the yeomen and townsmen who fought on foot. But in foreign wars the feudal cavalry alone were available, and the infantry were nearly all and always mercenary troops. Again, although the period for which the holders of fiefs were bound to military service had originally been uncertain and unlimited, it gradually became an established rule, to which the exceptions were everywhere trifling and rare, that it should be restricted in various countries to from forty to sixty days in each year. Hence warlike operations on anything like an extended scale would have been impossible if the terms of the feudal engagement had been strictly observed. In these circumstances it became customary to retain the feudal tenants under arms as stipendiaries after their ordinary and legitimate obligations had been fulfilled.

Besides consideration for the mutual convenience of sovereigns and their feudatories, there were other causes which materially contributed toward bringing about the changes in the military system of Europe which were finally accomplished in the thirteenth and fourteenth centuries. During the crusades vast armies were set on foot in which feudal rights and obligations had no place, and it was seen that the volunteers who flocked to the standards of the various commanders were not less but even more efficient in the field than the vassals they had hitherto been accustomed to lead. It was thus established that pay, the love of enterprise, and the prospect of plunder—if we leave zeal for the sacred cause which they had espoused for the moment out of sight—were quite as useful for the purpose of enlisting troops and keeping them together as the tenure of land and the solemnities of homage and fealty. Moreover, the crusaders who survived the difficulties and dangers of an expedition to Palestine were seasoned and experienced although frequently impoverished and landless soldiers, ready to hire themselves to the highest bidder, and well worth the wages they received. Again, it was owing to the crusades that the church took the profession of arms under her peculiar protection, and thenceforward the ceremonies of initiation into it assumed a religious as well as a martial character.

Soon after the greater crusading societies had been formed similar orders, such as those of St. James of Compostella, Calatrava, and Alcantara, were established to fight the Moors in Spain instead of the Saracens in the Holy Land. But the members of these orders were not less monks than knights, their statutes embodied the rules of the cloister, and they were bound by the ecclesiastical vows of celibacy, poverty, and obedience. From a very early stage in the development of chivalry, however, we meet with the singular institution of brotherhood in arms; and from it the ultimate origin if not of the religious fraternities at any rate of the military companionships is usually derived. Such bodies, raised by or placed under the command of a sovereign or grand master, regulated by statutes, and enriched by ecclesiastical endowments, would have been precisely what in after times such orders as the Garter in England, the Golden Fleece in Burgundy, the Annunciation in Savoy, and the St. Michael and Holy Ghost in France actually were. The knight, too, who had "won his spurs" was very differently esteemed from the knight who succeeded to them as an incident of his feudal tenure. In rank and the external ensigns of rank under the sumptuary regulations of the age they were equal. But it was the first and not the second who was welcomed in court and camp, who was invited to the "round tables" which the Arthurian romances brought into fashion among the potentates of mediæval Europe, and more particularly Edward III. and Philip VI. And thus it became the ambition of every aspirant to knighthood to gain it by his exploits rather than to claim it merely as his right by virtue of his position and estate. But there was one qualification for knighthood which was theoretically exacted even in England, and which was rigorously exacted abroad. Nobody could be legitimately created a knight who was not a gentleman of "name and arms," that is, who was not descended on both sides at the least from grandparents who were entitled to armorial bearings. And this condition is embodied in the statutes of every order of knighthood, religious or military, which can trace its origin to a period when chivalry was a social institution.

On the Continent the degree of knight bachelor disappeared with the military system which had given rise to it. It is now, therefore, peculiar to the United Kingdom, where, although very frequently conferred by letters patent, it is yet the only dignity which is still even occasionally created—as every dignity was formerly created—by means of a ceremony in which the sovereign and the subject personally take part. Everywhere else dubbing, or the accolade, seems to have become obsolete, and no other species of knighthood, if knighthood it can be called, is known except that which is dependent on admission to some particular order. It is a common error to suppose that baronets are hereditary knights. Baronets are not knights unless they are knighted like anybody else; and, so far from being knights because they are baronets, one of the privileges granted to them shortly after the institution of their dignity was that they, not being knights, and their successors and their eldest sons and heirs-apparent should, when they attained their majority, be entitled, if they desired, to receive knighthood. Notwithstanding, however, that simple knighthood has gone out of use, there are innumerable grand crosses, commanders, and companions of a formidable assortment of orders in almost every part of the world, from that of the Golden Fleece of Spain and Austria to those of St. Charles of Monaco and of King Kamehameha of the Sandwich Islands. But, with the exception of the orders of the Golden Fleece founded by Philip II., duke of Burgundy, in 1429, and of the Annunciation founded by Charles III., duke of Savoy, in 1518—now that the orders of St. Michael founded by Louis XI. and of the Holy Ghost founded by Henry III. of France, in 1469 and 1578, are either extinct or in abeyance—none of the foreign military as distinguished from the religious orders of knighthood have any actual historical connection with chivalry. The orders of the Genet of France and the Oak of Navarre of course are to be classed as mere fictions with the order of the Round Table of Britain. But the pretensions of almost every other foreign order to extreme antiquity, as for example of the Elephant and Danneborg of Denmark, the White Eagle of Poland, or the Seraphim of Sweden, if they are less obviously extravagant, are not more susceptible of verification. It has nearly always been the practice even in modern days to represent the establishment as the revival or reorganization of an order. The English have seven orders of knighthood, the Garter, the Thistle, St. Patrick, the Bath, the Star of India, St. Michael and St. George, and the Indian Empire; and, while the first is undoubtedly the oldest as well as the most illustrious anywhere existing, a fictitious antiquity has been claimed and is even still frequently conceded to the second and fourth, although the third, fifth, sixth, and seventh appear to be as contentedly as they are unquestionably recent.

It is, however, certain that the "most noble" Order of the Garter, at least, was instituted in the middle of the fourteenth century, when, to use Hallam's words, the court of England "was the sun, as it were, of that system which embraced the valor and nobility of the Christian world," when "chivalry was in its zenith, and in all the virtues which adorned the knightly character none were so conspicuous as Edward III. and the Black Prince." But in what particular year this event occurred is and has been the subject of much difference of opinion. All the original records of the order until after 1416 have perished, and consequently the question depends for its settlement not on direct testimony but on inference from circumstances. That the Prince of Wales was knighted on the landing of Edward III.'s expedition against France at La Hogue, in July, 1346, there can be no doubt. It seems pretty clear, however, that the Order of the Garter was instituted and the great feast celebrated, not in the midst of the Black Death, but at any rate some months before its ravages commenced. Regarding the occasion there has been almost as much controversy as regarding the date of its foundation. The "vulgar and more general story," as Ashmole calls it, is that of the countess of Salisbury's garter. At present the officers of the order are five—the prelate, chancelor, register, king of arms, and usher—the first, third, and fifth having been attached to it from the commencement, while the fourth was added by Henry V. and the second by Edward IV. The prelate has always been the bishop of Winchester; the chancellor was formerly the bishop of Salisbury, but is now the bishop of Oxford; the registership and the deanery of Windsor have been united since the reign of Charles I.· the king of arms, whose duties were in the beginning discharged by Windsor herald, is garter principal king of arms; and the usher is the gentleman usher of the Black Rod.

The other orders of knighthood subsisting in the British empire must be spoken of briefly. The "most ancient" Order of the Thistle was founded by James II. in 1687, and dedicated to St. Andrew. It consisted of the sovereign and eight knight companions, and fell into abeyance at the Revolution of 1688. In 1703 it was revived by Queen Anne, when it was ordained to consist of the sovereign and twelve knights companions, the number being increased to sixteen by statute in 1827. The most "illustrious" Order of St. Patrick was instituted by George III. in 1788, to consist of the sovereign, the lord lieutenant of Ireland as grand master, and fifteen knights companions, enlarged to twenty-two in 1833. The "most honorable" Order of the Bath was established by George I. in 1725, to consist of the sovereign, a grand master, and thirty-six knights companions. This was a pretended revival of an order supposed to have been created by Henry IV. at his coronation in 1399. Knights of the Bath, although they were allowed precedence before knights bachelors, were merely knights bachelors who were knighted with more elaborate ceremonies than others, and on certain great occasions. After the so-called revival the grand-mastership merged in the crown on the death of John, duke of Montagu, the first tenant of the office in 1749, and in 1815 and again in 1847 the constitution of the order was remodeled. Exclusive of the sovereign, royal princes, and distinguished foreigners, it is limited to fifty military and twenty-five civil knights grand crosses, one hundred and twenty-three military and eighty civil knights commanders, and six hundred and ninety military and two hundred and fifty civil companions. The "most distinguished" Order of St. Michael and St. George was founded by the prince regent, afterward George IV., in 1818, in commemoration of the British protectorate of the Ionian Islands, "for natives of the Ionian Islands and of the island of Malta and its dependencies, and for such other subjects of his majesty as may hold high and confidential situations in the Mediterranean." It ranks between the "most exalted" Order of the Star of India and the Order of the Indian Empire, of both of which the viceroy of India for the time being is *ex officio* grand master. Of these the first was instituted in 1861 and enlarged in 1876, and the second was established in 1878 in commemoration of the queen's assumption of the imperial style and title of the empress of India.

KNITTING is the art of forming looped fabrics or textures with the use of needles or wires and a single continuous thread. Crochet is an analogous art, differing from knitting in the fact that the separate loops are thrown off and finished successively, whereas in knitting the whole series of loops which go to form one length or round of the fabric are retained on one or more needles while a new series is being formed from them on a separate needle. The origin and history of the art of knitting are referred to under the heading of HOSIERY.

KNOLLES, RICHARD, author of the *History of the Turks*, was a native of Northamptonshire, and was born about 1545. In 1560 he entered Lincoln's College, Oxford, of which four years later he was elected fellow. After graduating M.A. he left Oxford to become master of the free school at Sandwich in Kent, where he died in 1610.

KNOT. In the scientific sense, a knot is an endless physical line which cannot be deformed into a circle. A physical line is flexible and inextensible, and cannot be cut—so that no lap of it can be drawn through another.

KNOT, a Limicoline bird very abundant at certain seasons on the shores of Britain and many countries of the northern hemisphere. Rather larger than a snipe, but with a short, plover-like bill and legs, the Knot visits the coasts of some parts of Europe, Asia, and North America at times in vast flocks.

KNOWLES, JAMES SHERIDAN, dramatic author, was born at Cork, May 21, 1784. His father was the lexicographer James Knowles, cousin-german of Richard Brinsley Sheridan. Not long after the removal of the family to London in 1793, young Knowles began his dramatic career by composing a play which was performed by himself and his juvenile companions. At the age of fourteen he published a ballad entitled *The Welsh Harper*, which was set to music and obtained great popularity; and about the same time his precocious talents secured him the friendship of Hazlitt, through whom he also formed an intimacy with Lamb and Coleridge. In 1817 he removed from Belfast to Glasgow, where, besides conducting a flourishing school, he continued his dramatic authorship. His first important dramatic success was *Caius Gracchus*, produced at Belfast in 1815; and by *Virginius*, written for Edmund Kean, and first performed in 1820, he obtained a very high place among the dramatic authors of the century. Besides *William Tell*, in which Macready performed one of his most successful parts, the other principal plays of Knowles are *The Hunchback*, *Love*, and *The Wife*. In his later years he forsook the stage for the pulpit, and as a Baptist preacher attracted large audiences, while he also entered the field of polemical theology, publishing two works, the *Rock of Rome*, and the *Idol Demolished by its own Priest*, in both of which he combatted the special doctrines of the Romish Church. He died at Torquay, November 30, 1862.

KNOW NOTHINGS, the popular name for the Native American party which was formed in the United States shortly before 1855, gained considerable successes in that year, lost its ground hopelessly in 1856, and soon after disappeared from American politics. Its distinctive principle was that the government of America must be in the hands of Americans; naturalization was to follow only after twenty-one years' probation, and allegiance to any foreign potentate or power—presumably including the pope—was to be a bar to selection for political office. The order was a secret one, and the popular name arose from the members professing always to "know nothing" when questioned about it. In the state elections of 1855 the party carried most of New England, besides New York, Kentucky, and California, and gained some successes in other states. In 1856 they nominated Mr. Fillmore for reëlection to the presidency, and polled nearly 875,000 votes, but they gained the electoral votes of Maryland only, and this defeat was the death-blow of the party. Nevertheless its radical principle, in the form of revolt against the tendency to allow political power to fall into the hands of a particular body of foreign-born citizens, occasionally reappears in American politics. In Boston, for instance, in 1889, the native-born citizens combined to snatch the city government from Irish hands; and the unsuccessful attempt to defeat the Tammany Hall nominees at New York at the same time exhibits a similar reaction at work.

KNOX, John, the great Reformer of Scotland, was born at Haddington, the county seat of East Lothian, in the year 1505. His father was William Knox, commonly said to have been descended from the Knoxes of Ranfurly in Renfrewshire. The name of his mother was Sinclair, and some of his letters, written in seasons of danger, were signed "John Sinclair." At about sixteen years of age he was sent to the University of Glasgow, where Dr. John Mair or Major was principal regent, or professor of philosophy and divinity. Owing to some undiscovered cause he left the university without qualifying himself to take the degree of master of arts.

The martyrdom of Wishart in 1546 was the turning point in the spiritual life of Knox, determining him to renounce scholastic theology and to profess his adherence to the Protestant faith. As this subjected him to suspicion and trouble, he resolved to leave Scotland and visit the schools of Germany; but Douglas of Longniddrie and Cockburn of Ormiston, to whose sons Knox had for some time been acting as private tutor, prevailed on him to relinquish his design, and, along with his pupils, to enter the castle of St. Andrews as a place of safety from the Romish clergy. It was here that Knox received a public call to the ministry.

In June of the same year (1547) the Catholics of Scotland and France joined their forces to avenge the death of Cardinal Beaton by capturing the Protestant garrison of St. Andrews, the French fleet appeared in the bay, and the castle surrendered. It was stipulated that the lives of the refugees should be spared, that they thould be removed to France, and that such of them as declined entering the French service should be conveyed to any other country except Scotland. Knox, sharing the fate of his companions, was conveved on board one of the French ships to Rouen; but the terms of the capitulation were grossly violated, and the captives were treated as prisoners of war. Knox and some others were sent on board the galleys, and after being loaded with chains were compelled to labor at the oar. Here they were subjected to many indignities and much suffering; but in spite of every hardship and every threat, not one of their number renounced his faith. During the ensuing winter the galley in which he was confined lay in the Loire; and in the summer of 1548 it sailed for Scotland, and cruised off the east coast. The hardships to which he was now subjected produced a very serious effect upon his health; he was seized with a violent fever, and no hope entertained of his recovery. He, however, regained his strength, and during his captivity had sufficient energy of mind to engage in literary work.

After an imprisonment of eighteen or nineteen months Knox obtained his release from the French galleys in February or March, 1549. As he probably owed his freedom to the intercession of Edward VI. or the English government, he went to London on obtaining his liberty, and was favorably received by Archbishop Cranmer and the lords of council. Having been accused of asserting that the sacrifice of the mass is idolatrous, the preacher was cited to appear before the bishop, and to give an account of his preaching. Accordingly, on April 4, 1550, Knox entered into a full defense of his opinions, and with the utmost boldness proceeded to argue that the mass is a superstitious and idolatrous substitute for the sacrament of the Lord's Supper. The bishop did not venture to pronounce any ecclesiastical censure; and the fame of the obnoxious preacher was extended by this feeble attempt to restrain the boldness of his attacks on the doctrines of Rome.

Upon Knox's reforming work while a preacher at Berwick some interesting light has recently been thrown by the late Doctor Lorimer's *John Knox and the Church of England*, 1875. At the close of 1550, or early in 1551, Knox was transferred to Newcastle-upon-Tyne, where he remained, with occasional absences in London, till the spring of 1553. In the closing month of 1551 he was appointed one of six chaplains to Edward VI., and in virtue of this appointment he was consulted in the preparation of the formularies of the Church of England. A book of forty-five articles of religion, forming the basis of the thirty-nine articles of the Anglican Church, drawn up by Cranmer, was submitted to the royal chaplains for their opinion. Shortly after this the duke of Northumberland originated a proposal to make Knox a bishop. The duke's wish was that the king would "appoint Mr. Knocks to the office of Rochester Bishoprick." When, however, the Scotch chaplain was informed of what was in contemplation, and was instructed to wait upon Northumberland, the latter did not find the man he thought to benefit eager to grasp at promotion, and the matter ultimately came to nothing by the default of Knox himself. The last year of work in England was spent mainly in London and the southern counties. As royal chaplain Knox preached in turn before the court, and found favor with his royal hearer; but he was twice summoned before the privy council, first to answer complaints made by his would-be ducal patron, and then to vindicate his declinature of the vacant living of All Hallows in London.

Edward VI. having died in July, 1553, and, the Marian persecutions having shortly afterward broken out, Knox was persuaded to withdraw from England, and sailed for Dieppe, landing at that town in January, 1554. The enforced leisure of exile gave the refugee an opportunity of completing and publishing several treatises during two sojourns in the same year at Dieppe. After visiting the churches of France and Switzerland, Knox accepted an invitation to become one of the pastors of the English congregation at Frankfort-on-the-Main, and repaired thither in November of the same year. Soon after his settlement dissensions arose in the congregation in regard to the use of the surplice, the omission of the litany, the audible responses, and kneeling at the communion. A party in the congregation, clamorous for a strict adherence to the English Book of Prayer, lodged information with the magistrates that Knox, in his "Faithful Admonition," had used treasonable language in speaking of the emperor, the queen of England, and her husband Philip II. Not wishing to increase the troubles, the maligned preacher relinquished his charge on March 26, 1555, and retired to Geneva. The closing months of that year and the opening ones of the year following form an important period in the public labors and the private life of the Reformer; for he then visited his native country, preached in Edinburgh, in West Lothian and in Ayrshire, and dispensed the communion privately in several places. Before his visit came to a close he addressed a letter to the queen regent, in the hope that she might be persuaded to extend her protection to the Reformed preachers, or at least listen favorably to their doctrine. In visiting Scotland at that time, however, Knox was influenced by other considerations than those bearing simply on the public weal. For as far back as his Berwick ministry he had become acquainted with the family of Richard Bowes, and formed an attachment for the fifth daughter, Marjory. Doctor M'Crie represents the marriage as having taken place in 1553, before Knox left England; and in support of his view it falls to be said that after that date Knox addresses Mrs. Bowes as "Dearly Beloved Mother," and that he speaks of Marjory as his "wife," his "dearest spouse." But, considering the strong opposition to the union on the part of Richard Bowes and other relatives, as also the very uncertain and precarious position of the reformer at the time, there is good reason to think, with Doctor Laing, that then the parties had only formally pledged themselves to one another "before witnesses," and that the actual marriage took place when Knox visited Scotland in 1555.

At the urgent solicitation of the English congregation at Geneva, consisting largely of those who had withdrawn from Frankfort, Knox left Scotland in the summer of 1556; and in the *Livre des Anglois á Geneve*, on September 13th of that year, the names of "John Knox, Marjory, his wife; Elizabeth, her mother; James (*blank*), his servant; and Patrick, his puple," are entered as members of the English congregation. In Geneva the Scotch Reformer labored with voice and pen till 1559. Judged by the excitement it created, the most outstanding writing of this period is *The First Blast of the Trumpet against the Monstrous Regiment of Women;* and it cannot be denied that this publication was unseasonable, and might be expected to expose the author to the resentment of two queens during whose reign it was his lot to live. Indeed the sounder of the *First Blast* would seem to have realized that it was "blown out of season," for, whereas his purpose was "thrice to blow the trumpet in the same matter, if God so permit," and on the last occasion to reveal his name, the intention was never carried into effect. The resentment to which his blast against feminine government gave rise in queenly breasts did not soon subside; one immediate effect was, that when Knox resolved to return to Scotland, and applied to the English Government for permission to pass through the sister kingdom, the application was refused. Impatient of delay, he sailed from Dieppe direct for Leith, and, landing at that port in safety, reached Edinburgh, May 2, 1559.

From this time to the close of his life the biography of the Reformer becomes inseparably connected with the history of Scotland. Within a few days of his arrival in Scotland, through the representations of the Romanist clergy to the queen-regent, Knox was proclaimed an outlaw and a rebel; but undeterred by considerations of personal danger, he lost no time in joining the leaders of the Protestant party then assembled in Dundee. From Dundee he went with them to Perth, where his preaching was the antecedent though not the cause of a tumult which resulted in the altar, images, and other ornaments of the church being torn down, and the houses of the gray and black friars being laid in ruin. St. Andrews is the next place of importance at which Knox joined the Protestants, at this time called the congregation, the lay leaders of the party, mostly noblemen, being known as the lords of the congregation. Here Knox announced his intention to preach in the cathedral church; and undismayed by the threats of the archbishop, unmoved by the remonstrances of his friends, he carried his purpose into effect, preaching on four successive days, and with such signal effect that the provost, bailies, and inhabitants agreed to set up the Reformed worship in the town, stripped the church of images and pictures, and pulled down the monasteries. By the end of June Knox was again in Edinburgh preaching in St. Giles' and the abbey church; and on July 7th he was elected minister of Edinburgh.

When the army of the queen-regent took possession of the capital, and the lords of the congregation agreed to leave it, they took their minister with them from a regard alike to the danger to which he would be exposed if left behind and the service it was in his power to render the Protestant cause. The result abundantly verified the wisdom of the step, for, set free from city labors, Knox traveled over a great part of Scotland, and visited the towns of Kelso, Jedburgh, Dumfries, Ayr, Stirling, Perth, Brechin, Montrose, Dundee, and St. Andrews, with marked results in the diffusing of knowledge and the strengthening of the hands of fellow Protestants. By the end of April, 1560, we find him once more in Edinburgh, having rendered important service to the Protestant leaders in their negotiations to procure aid from England, and, of necessity rather than from choice, acting the part of a politico-ecclesiastic. The most elaborate theological writing of the Scottish Reformer, although written before his final return to Scotland, was published in this year, 1560, at Geneva. It is *An Answer to the Cavillations of an Adversary respecting the doctrine of Predestination.*

The event of greatest political importance in this same year, 1560, was the assembling of the Scottish parliament at Edinburgh, on August 1st. A petition having been presented by the Protestants of the country, craving the abolition of Popish doctrine, the restoration of purity of worship and discipline, and the appropriating of ecclesiastical revenues to the support of the ministry, the promotion of education, and the relief of the poor, the ministers and barons were required to lay before parliament a summary of reformed doctrines. "Within foure dayis" this was done. The confession was read before the whole parliament, and after reasoning and voting was ratified by act of parliament, and the Protestant religion formally established. Between the dissolution of parliament and the first meeting of the General Assembly of the Church of Scotland on December 20th, Knox and three other ministers were engaged in drawing up the plan of ecclesiastical government known as the *Book of Policy* or *First Book of Discipline.* This standard document, approved by the General Assembly and subscribed by a majority of the members of privy council is also incorporated in Knox's *Historie.*

The youthful, widowed, and fair Queen Mary, having arrived in Scotland in August, 1561, lost no time in sending for Knox to the palace of Holyrood, in order that she might hold with him the first of those four or five dialogues which historians have rendered with dramatic effect not always consistent with historical accuracy.

In the following year Knox found a more congenial sphere for the exercise of his logical and dialectic skill in a disputation with Quintine Kennedy, abbot of Crossragwell, in the neighborhood of Maybole, Ayrshire. The abbot had set forth a number of articles respecting the mass, purgatory, praying to saints, the use of images, and other points which he declared his intention to open up more fully in his chapel at Kirkoswald. But when Knox, who happened to be in the vicinity, appeared on the Sabbath specified, the abbot deemed it prudent to absent himself, and Knox preached in his stead. This led to correspondence which resulted in arrangements for a disputation taking place. The disputants met at Maybole on September 28, 1562, and the two following days at 8 A.M., in the house of the provost. Forty persons on each side were admitted as witnesses of the dispute. As usually is the case in such contentions, both sides claimed to be victorious; but, to counteract the one-sided reports circulated by the abbot and his friends, Knox published, in 1563, an account of the dispute taken from the records of the notaries present, to which he added a prologue and short marginal notes.

Queen Mary, having failed to influence the Reformer by her "many salt tears" or her flattery, endeavored to get him into her power by moving the privy council to pronounce him guilty of treason on the ground that he had written a circular letter to leading Protestants in reference to the trial of two persons indicted for a riot in the Chapel Royal. Knox's trial took place at a special meeting of council in December, 1562, at which the queen was present and acted an unseemly part as prosecutrix. To the unconcealed chagrin and intense displeasure of his sovereign, Knox was by a majority of the noblemen present absolved from all blame and commended for his judicious defense.

The occasion of his second appearance before the privy council was the preaching of a sermon in St. Giles' about a month after the marriage of Queen Mary and Lord Darnley in July, 1565. On the day the sermon was preached the young king made an imposing appearance, sitting on a throne prepared for his reception. Enraged by what he regarded as passages having a reference to himself in the discourse of the preacher, Darnley returned to the palace with the determination not to taste food till the offender had been punished. Knox was accordingly called before the council, "from my bed," as he tells us. Informed that he had offended the king, and that he must desist from preaching so long as their majesties remained in Edinburgh, Knox made reply that he had spoken nothing but according to his text, and, if the church should command him either to speak or abstain, he would obey, so far as the word of God would permit him. In regard to the sermon he deemed it necessary for his own exoneration to write out in full what he had spoken, and publish it with a preface dated at "Edingbrough, September 19, 1565." This sermon is the only specimen of Knox's pulpit discourses handed down to us. Doctor M'Crie is of opinion that the prohibition was of a very temporary nature; but it does not appear that Knox resumed his usual ministrations in Edinburgh, unless at occasional intervals, till after Mary had been deprived of her authority in 1567. During this period of absence from his charge, however, the inhibited preacher was far from idle. In 1566 he drew up the most considerable portion of his *Historie of the Reformatioun*, having made a commencement in 1559 or 1560, and he wrote, at the request of the Assembly, various public letters. He also visited churches in the south of Scotland, and made a journey to England.

On July 29, 1567, the infant James VI. was crowned in the parish church of Stirling, and on that occasion Knox reappeared in public and preached the coronation sermon. He also preached at the opening of parliament in December of the same year, when the Confession of Faith formed and approved by parliament in 1560, with various acts in favor of the Reformed religion, was solemnly ratified. When James Stuart, earl of Murray and regent of Scotland, was assassinated and died at Linlitngow, January 23, 1569, the event caused anguish and anxiety to the Reformer, who poured out the sorrows of his heart in the sermon and the prayers of the day on which the tidings reached the capital, and who thereafter preached the funeral sermon in the presence of three thousand persons gathered to witness the interment in the south aisle of the collegiate church of St. Giles. The strain to which body and mind alike had been subjected for many years back, and the shock caused by the removal of the nobleman in whom he placed the greatest confidence, affected the Reformer's health, and in the month of October, 1870, he had a stroke of apoplexy. Although he so far rallied as to have the use of speech restored to him and to resume preaching, he never entirely recovered from the debility which the stroke produced.

Resolved to take no prominent part in public affairs, and confining himself to preaching in the forenoon of the Lord's day, Knox might have spent what little of life on earth remained for him in the house assigned him by the provost and town council of Edinburgh, had he not become personally obnoxious to Kirkcaldy of Grange. This and the trouble which agitated the country induced Knox, "sore against his will, being compellit by the Brethren of the Kirk and Town," to quit the metropolis and retire to St. Andrews. During his stay there of fifteen months the many infirmities of age did not prevent him engaging in his two favorite employments of preaching and writing.

By the end of July the adherents of the queen's party abandoned Edinburgh, and so enabled the banished citizens to return to their homes. One of their first acts was to send for Knox, who, traveling slowly because of weakness, reached the capital (for the last time) on August 23, 1572. Only two more public appearances were to be made by him. The first of these was when in September tidings came to Edinburgh of the St. Bartholomew massacre. Being assisted to reach the pulpit, and summoning up the remainder of his strength, he thundered out the vengeance of heaven against "that cruel murderer and false traitor, the king of France," and desired the French ambassador to tell his master that sentence was pronounced against him in Scotland, that the Divine vengeance would never depart from him nor from his house if repentance did not ensue; but that his name would remain an execration to posterity, and none proceeding from his loins should enjoy his kingdom in peace. The other occasion on which the debilitated Reformer appeared in public was the induction of Lawson, sub-principal of King's College, Aberdeen, as his successor, which took place November 9th. After taking a leading and solemn part in the services, he crept down the street leaning upon his staff and the arm of his attendant, and entered his house never to leave it alive. Knox died on Monday, November 24, 1572, in in the sixty-seventh year of his age.

KNOXVILLE, chief city of Knox county and of

East Tennessee, is situated on the right bank of the Tennessee river, which is navigable up to this point, four miles below the confluence of the Holston and French Broad rivers, and about 165 miles east of Nashville. By recent statistics it is shown to be one of the six healthiest cities in the United States; the elevation is 1,000 feet, mean temperature 58° Fahr., average rainfall 54.5 inches. Among its numerous handsome buildings are the United States custom-house and post-office, the university of Tennessee, and the public schools. There is a free library in the city. The university, which includes the State college of agriculture and the mechanic arts, was founded in 1807, the latter departments being added in 1869. It has a good library, and geological, mineralogical, and zoölogical collections. Knoxville is a busy industrial and commercial center. Its manufactures include iron in all its forms, railway and other carriages, paper, furniture, sash and blinds, tobacco, flour, leather and harness, pottery, etc.; and it has a brisk trade in these articles, as well as in boots and shoes, hardware, and dry-goods. Marble and coal of excellent quality are found in vast quantities near the city. Knoxville was settled in 1789, and laid out as a town in 1791, when it was named after Gen. Henry Knox, at that time Washington's secretary of war. From 1794 till 1817 it was the capital of Tennessee. During the civil war it was an important position, passing into the possession of the Union forces in 1863. The population of the city, by the census of 1900, was 32,637.

KÓBELYAKI; a town of Russia, in the government of Poltava, forty miles southwest of the government town, with a station on the railway between Kharkoff and Krementchug. Population, 13,000.

KOBRIN, a town of Russia, in the government of Grodno, twelve miles east of Brest-Litovsk and four miles from the Tevli station of the railway between Minsk and Brest-Litovsk. Population, 8,000.

KOCK, Charles Paul de, novelist, was born at Passy on May 21, 1794, and died at Paris, August 29, 1871. His novels are amusing sketches of Parisian life. Paul de Kock was the Charles de Bernard of low life, and greater praise of its kind could hardly be given to any writer.

KODUNGALÚR, or Cranganore, a town in Cochin state, Southern India, with a population of 9,475.

KOHÁT, a district in the lieutenant-governorship of the Punjab, India, consists chiefly of a bare and intricate mountain region, deeply scored with river valleys and ravines, but inclosing a few scattered patches of cultivated lowland. Population (1901), 150,000.

Koհát, the chief town and cantonment of the above district, near the north bank of the Kohát Toi river, and two miles from the southern base of the Afridi Hills. The population, including the cantonment, is 11,274.

KOHL, Johann Georg (1808–1878), traveler and author, was born at Bremen.

KOKOMO, the capital of Howard county, Ind., is situated at the junction of several railroads, fifty-four miles north of Indianapolis. It contains one national and two other banks, several foundries and factories, and has good school and church accommodation. Population (1900), 10,609.

KOLÁBA, a district of the Bombay Presidency, India. Lying between the Sahyádri range and the sea, Kolába district abounds in hills, some being spurs of considerable regularity and height, running at right angles to the main range, while others are isolated peaks or lofty detached ridges. The sea frontage, of about twenty miles, is throughout the greater part of its length fringed by a belt of cocoanut and betelnut palms. Behind this belt lies a stretch of flat country devoted to rice cultivation. It has a population of over 350,000.

KOLÁR, or Colar, a district of Mysore state, Southern India. The population in 1871 was 618,954, spread over an area of 2,577 square miles—Hindus numbering 592,652; Mohammedans, 25,038; Jaíns, 651; and Christians, 613. Four towns contain upward of 5,000 inhabitants, namely, Kolár, 9,924; Chikballapur, 9,882; Siálghata, 7,009; and Hosur, 5,711.

KÖLCSEY, Ferencz or Francis (1790–1838), a distinguished Hungarian poet, critic, and orator, was born at Szödemeter, in Transylvania.

KOLDING, a town in the district of Veile, Denmark, is situated on the east coast of the province of Jutland, on the Koldingfjord, an inlet of the Little Belt. Population (1890), 6,000.

KOLHÁPUR, a native state in the Bombay Presidency, India. The area is 3,184 square miles. Kolhápur state stretches from the heart of the Sahyádri range eastward into the plain of the Deccan. Along the spurs of the main chain of the Sahyádri hills lie wild and picturesque hill slopes and valleys producing little but timber, and till recently covered with rich forests. The center of the state is crossed by several lines of low hills running at right angles from the main Sahyádri range. In the east the country becomes more open, and presents the unpicturesque uniformity of a well-cultivated and treeless plain, broken only by an occasional river. The population of the state, including feudatories, is 817,303, Hindus amounting to 95½ per cent., and Mohammedans to 4 per cent. Pottery, hardware, and coarse cotton and woolen cloth are the principal manufactures. The chief exports are coarse sugar, tobacco, cotton, and grain; piece goods, salt, silk, sulphur, and spices are imported.

Kolhápur, the capital of the above state, is situated 128 miles south by east of Poona. It is a picturesque, flourishing trading town, adorned with many handsome buildings. Population, 39,621.

KOLIN, a town in the circle of Kaurzim, Bohemia, is situated on the Elbe, about thirty-five miles east of Prague, with which city, as also with Brünn, it is connected by the Austrian State Railway. Kolin is chiefly famous on account of the battle of Chotzemitz or Kolin, June 18, 1757, when the Prussians under Frederick the Great were defeated by the Austrians under Daun.

KOLOMEA, or Kolomyia, a town and district in the Austrian province of Galicia, lies on the right bank of the Pruth, and on the railway from Czernowitz to Lemberg, about 105 miles south-southeast of the latter. Population (1901), 34,188.

KOLOMNA, a district town of Russia, in the government of Ryazan, situated on the railway between Moscow and Ryazan, sixty-seven miles southeast of Moscow, at the confluence of the Moskva river with the Kolomenka. Population, 19,000.

KÓMORN, or Comorn, a royal free town of Hungary, and capital of the trans-Danubian county of Komárom, lies at the eastern extremity of the island of Csallóköz or Schütt, and at the confluence of the Waag with the Danube, forty-eight miles west-northwest from Budapest, with which city, as also with Vienna, it is directly connected by railway. The inhabitants carry on a brisk trade in grain, timber, wine, flour, and fish. The civil population amounts to 13,108, mostly Magyars and Germans by nationality.

KOMOTAU, a town and district of Bohemia, at the foot of the Erzgebirge, and at the junction of the Buschtiehrad, Dux-Bodenbach, and Aussig-Teplitz lines of railway, about ten miles north-northwest of Saaz. The population is 10,111.

KONGSBERG, a mining town in the district of Buskerud, Norway, is situated on the Laagen, about sixty miles southwest of Christiania by rail. Population, 5,000.

KÖNIGGRÄTZ, a fortified town and episcopal seat in Bohemia, at the confluence of the Adler with the upper Elbe, and at the junction of the Reichenberg-Pardubitz and Northwestern lines of railway. The place is chiefly notable from the battle of Königgrätz or Sadowa fought in its neighborhood on July 3, 1866, when the defeat of the Austrians under Benedek decided the German supremacy of Prussia, and led to the acquisition of Venice by Italy and the constitutional independence of Hungary. Population, 15,715.

KÖNIGINHOF, chief town of a department in the northeast of Bohemia, is situated on the left bank of the Elbe, about eighty miles northeast of Prague. Population, 7,000.

KÖNIGSBERG, chief town of a government district in the province of East Prussia, and since 1843 a fortress of the first rank is situated on the Pregel, four and a half miles from its mouth in the Frische Haff, twenty-five miles from the seacoast, and 397 miles northeast of Berlin. It consists of three formerly independent parts—the Altstadt (old town) to the west, Lobenicht to the east, and the island Kneiphof, together with numerous suburbs, embraced in a circuit of nine and a half miles. The Pregel, spanned by many bridges, flows through the town in two branches, which unite below the green bridge. Its greatest breadth within the town is from eighty to ninety yards. It is frozen from November to March. The university was founded in 1544 by Albert I., Duke of Prussia; it possesses a library of 200,000 volumes. Among its famous professors have been Kant (born at Konigsberg in 1724), to whom a monument was erected in 1864, Herder, Herbart, Bessel, Voight, K. E. Von Baer, F. Neumann, and others. Population, (1901), 187,897.

KONIGSHUTTE, a town in the circle of Beuthen in the government district of Oppeln, Prussia, is situated in the middle of the Upper Silesian coal and iron district, about fifty-five miles southwest of Oppeln. The population is (1900) was 57,875.

KÖNITZ, or Könitz, a town of the German empire, in the Marienwerder district of the province of West Prussia, situated near the railway, about sixty-eight miles southwest of Dantzic. Population, 9,000.

KONOTOP, a district town of Russia, in the government of Tchernigoff, 137 miles northeast of Kieff, on the railway from this town to Kursk. Its 10,000 inhabitants live by agriculture, boat-building and trade.

KÖPENICK, or Cöpnick, a town in the circle of Teltow in the government district of Potsdam, Prussia, is situated on an island at the influx of the Dahme into the Spree.

KOPREINITZ, an ancient royal free town of Hungary, in the province of Croatia and Slavonia and county of Körös, is situated about sixteen miles northeast of the county town Körös (Kreutz), and on the Zákány-Zágráb line of the Hungarian state railway. Population about 8,000.

KOPRILI, Kiuprili, or Köjprülü, a town in the vilayet of Prisrend, Macedonia, Turkey, is situated on both sides of the Vardar, the ancient Axius. Its Christian inhabitants call it Velesa, probably a corruption of Bylazora, described by Polybius as the chief city of Pæonia. The population of Koprili, which has given its name to a celebrated family of viziers, is about 15,000.

KORAN. See Mohammed.

KORAT, a small territory, tributary to Siam, is situated to the northeast of Bangkok, on the borders of Siam and Cambodia.

KORDOFAN, a province of the Egyptian Sudan. On the east it does not reach the Nile, and on the west it is usually held to be separated from Darfur by a neutral strip of country. It consists for the most part of a rolling steppe in which a hill of fifty feet is a landmark for a day's journey; but toward the west there are a few isolated peaks such as Jebel Abu Senun and Jebel Kordofan, which rise to a height of 150 to 800 feet above the plain, and in the northwest there are two considerable groups, Jebel Katul and Jebel Kagga. The settled population of Kyrdofan is estimated at 164,740, the nomadic at 114,000.

KOREÁ, a petty native state in Chutiá Nágpur, Bengal, India.

KORITSA, Goritsa, Geortsha, or Ghiorghia, a town of Albania, in the Turkish vilayet of Janina, situated in a spacious plain forty-five miles east of Berat and thirty miles west of Kastoria. It is a place of about 10,000 inhabitants, containing a considerable number of well-built houses scattered among its cottages of unbaked mud.

KÖRNER, Karl Theodor, German patriot and poet, was born at Dresden September 23, 1791. His father, a prosperous lawyer, made his house in Dresden a center of literary, musical, and artistic society, and was an intimate friend of Schiller; and his mother, a daughter of the copper-plate engraver Stock of Leipsic, enjoyed Goethe's friendship through life, and in her later years claimed it for her son. At the age of seventeen he went to the school of mines in Freiberg, and worked enthuiastically for two years at mathematics, mineralogy, and chemistry. The poems he wrote during this period were collected and published under the title *Knospen.* From Freiberg Körner went to the university of Leipsic, where for some months he studied philosophy, history and anatomy. From Leipsic he went to Berlin, and then to Vienna, with letters to his father's old friends, the Prussian ambassador Von Humboldt and Friedrich Schlegel. Two little pieces which he wrote for the stage, *Die Braut* and *Der grüne Domino,* were acted at the Vienna Court Theater in July, 1812, with great success; and, with the consent of his parents, he gave up all his former plans, with the hope of being able to make a living by literature alone. His other works followed with astonishing rapidity. In some fifteen months appeared some dozen dramatic pieces and the librettos of a few operas, besides many short poems. One after the other all his plays were received at the Vienna Theatre with applause. *Zriny,* founded on an heroic incident in Hungarian history, was the favorite with the public. In January, 1813, at the age of twenty-one, Körner was appointed poet to the court theater in Vienna. In the early spring of 1813 there was published the *Fatherland's Call to Arms in the Struggle for Liberation,* and Körner was one of the first to answer the summons. He left Vienna in March, and at Breslau joined the Prussian free-corps then forming under the command of Lützow. When the corps was solemnly consecrated in the village church at Rogau a few days later, the service was opened with a chorale, set to Körner's words, "Dem Herrn Allein die Ehre;" and almost immediately afterward, when Petersdorf was sent on a mission to Dresden, to try to unite the Saxons in the common cause, the young poet was sent with him, and on this occasion published his spirited prose *Address to the People of Saxony.* Here Körner saw his parents and friends for the last time. In April he was made lieutenant by the vote of his comrades; and a little later, having left the infantry, he was made adjutant to Lützow himself. At Kitzen, near Leipsic, during the three weeks' armistice, he was severely wounded through the treachery of the enemy, but after several adventures escaped to Carlsbad, where he remained till he was well enough to resume his former post. Lützow's free-corps was in almost daily action when the young adjutant was welcomed back. His cheerful zeal and self-denying helpfulness had endeared him to all his comrades, and it was his wild war songs, sung by many voices to old national melodies around the camp fires at night, that helped to spread that fervor in the corps which made it peculiarly terrible to the enemy. The poems written by him at this time are published under the title *Leyer und Schwert.* His last poem, "Das Schwertlied," was scribbled in his pocket-book at dawn on August 26th, when the corps was prepared for action; and he was reading it to a friend when the order to attack was given. It is the wildest of all his war-songs, a love-rhapsody to his sword—the soldier's bride; and it was this poem that suggested the refrain of Mrs. Hemans' beautiful verses to his memory. In the engagement that followed, on the high road between Gadebusch and Schwerin, Körner, as adjutant, fought at Lützow's side. The French were in great force, but were overcome and fled. Among the hottest in pursuit was Körner, who was mortally wounded, as he rode through a wood, by a shot from one of the fugitive *tirailleurs* who lay hidden there. He was buried with full military honors under an old oak on the road from Lübelow to Dreikrug by the village of Wöbbelin, where there is now a monument to his memory.

KOROTCHA, a district town, in the government of Kursk, Russia, 100 miles south of Kursk, on the Korotcha river. Population, 7,500.

KOROTOYAK, a town of Russia, in the government of Voronezh, on the right bank of the Don, six miles from the Davydovka railway station, and forty-seven miles south of Voronezh. Population, 9,000.

KOSCIUSKO, or KOSCZIUSKO, THADDEUS, Polish patriot, was descended from an old family of small proprietors in the province of Lithuania, and was born in 1746. From his father he inherited a taste for music, and in the other branches of education he showed such marked aptitude at the cadet school of Warsaw that, along with some other youths, he was sent at the expense of the state to complete his education at Versailles, Brest, and Paris. On his return to Poland he was appointed captain of artillery, but on account of the unfortunate result of his attachment to the daughter of a nobleman he in 1777 went to Paris, whence he sailed with the French fleet to aid the American States in their war of independence. Under Washington he displayed great firmness and intrepidity in various trying circumstances, and rose to be general of a brigade. In 1786 he returned to his native country, where he lived in retirement until the reorganization of the army in 1789, when he was appointed major-general. In the war with Russia which followed the adoption of the new constitution of 1791 he conducted himself with conspicuous valor and skill, and at Dubienka, with a force of only 4,000 men, held an army of 20,000 Russians at bay. All his efforts were, however, rendered fruitless by the pusillanimity of King Stanislaus, who in March, 1792, agreed to a humiliating peace, upon which Kosciusko along with several other leading officers resigned his commission. A second partition of Poland was consummated in August, 1793, but a spirit of resistance gradually gathered force and culminated in the insurrection of 1794, when Kosciusko was recalled to Cracow, and appointed generalissimo and dictator. With an army of 5,000 he marched to meet the Russians, who were advancing upon Cracow in greatly superior numbers, and after a strenuous conflict of four hours' duration completely defeated them. On receipt of the intelligence Warsaw rose against the Russian authorities, putting 7,000 persons to death; and after instituting a new government Kosciusko went in pursuit of the enemy, who retired toward the Prussian frontiers. But for the interposition of Prussia the emancipation of Poland would have been accomplished. King Frederick William, however, advanced against Warsaw with an army of 40,000 men, to which Kosciusko could oppose only 15,000. He was defeated at Szezekocin, but retreated in good order upon Warsaw, which he defended with stubborn persistence, until the diversion of an insurrection in Great Poland caused them to raise the siege. Meantime an immense force of Russians was advancing against Warsaw in two divisions, the one under Suwaroff and the other under Fersen. Kosciusko resolved to attack Fersen before his junction with Suwaroff, but, as he had only 4,000 men to meet the 14,000 Russians, his small army was in a few moments completely enveloped by superior numbers, and he himself fighting desperately fell pierced with several wounds. A tradition that as he fell he gave utterance to the words "Finis Poloniæ" found currency several years afterward, but when it came to his knowledge he indignantly denied it. For two years he remained a prisoner at St. Petersburg, but, gaining his liberty after the accession of Paul I., he went to England and then to America. Returning to France in 1798, he took up his residence at Fontainebleau. In 1806 he refused to allow Napoleon, whose professions he rated at their proper value, to use his name to incite a rising in Poland against Russia; and the forged address put forth by Napoleon in his name was never accepted by his countrymen as genuine, although Kosciusko was unable to disavow it until eight years after it was issued. In 1814, when the Russian army entered France on the fall of Napoleon, Kosciusko had a long interview with the emperor Alexander of Russia, who, it is said, promised to him to restore to Poland its ancient boundaries. In 1815 he settled in Switzerland, devoting himself chiefly to agricultural pursuits. His death, October 17, 1817, was the result of an accidental fall from his horse.

KOSI, a town in Muttra (Mathura) district, North-Western Provinces, India, with a population of 12,770.

KÖSLIN, or CÖSLIN, chief town of a circle and government district in the province of Pomerania, Prussia, is situated at the foot of the Gollenberg, five miles from the Baltic coast, and about eighty-six miles northeast of Stettin (105 by rail). Population, 17,227.

Köslin was built in 1188 by the Saxons, and made a town in 1266. In 1532 it embraced the Reformation. It was severely tried in the Thirty Years' War, and in the Seven Years' War. In 1720 it was burned. On the Gollenberg stands a monument to the memory of the Pomeranians who fell in the war of 1813–15. The town formerly possessed a mint of its own.

KOSLOFF, or KOZLOV, a town in the government of Tamboff, Russia, on the railway between Ryajsk and Saratoff, forty-five miles west of Tamboff, on the Lesnoy Voronezh river. Population, (1898), 40,347.

KOSTENDIL, GIUSTENDIL or DJUSTENDIL, a town in the extreme south of the principality of Bulgaria, Turkey, is situated on the Strouma, the ancient Strymon. Population, 8,000.

KOSTER, or COSTER, LAURENS (1370?–1440), the first Dutch printer, whose claims to be considered at least one of the inventors of the art (see PRINTING) have been recognized by many investigators. His real name was Laurens Janssoen—Koster (*i.e.*, sacristan), being merely the title which he bore as an official of the great parish church of Haarlem.

KOSTROMA, a central government of Russia in Europe, surrounded by those of Vologda, Vyatka, Nijni-

Novgorod, Vladimir, and Yaroslav, lies mostly on the left bank of the upper Volga, and has an estimated area of 32,490 square miles, and a population of 1,430,000.

KOSTROMA, a town of Russia, capital of the government of the same name, 230 miles northeast of Moscow and fifty-five miles from Yaroslav. It is situated on the left bank of the Volga, at the mouth of the navigable Kostroma river, with suburbs on the opposite side of the Volga. It is one of the oldest towns of Russia, having been founded by Youri Dolgorouky in 1152. Population, 30,000.

KOTAH, a native state in Rájputána, India, entirely surrounded by native territory. The area is 3,784 square miles, with an estimated population of 526,267.

KÖTHEN, or CÖTHEN, chief town of a circle in the duchy of Anhalt, Germany, is situated on the Ziethe, at the junction of several railway lines, about forty-two miles northwest of Leipsic by rail. The population, including the garrison, was, in 1901, 22,092.

KOTRI, a town in Karáchi (Kurrachee) district, Sind, India, situated on the right bank of the Indus.

KOTTBUS, or COTTBUS, chief town of a circle in the government district of Frankfort, Prussia, is situated on the Spree, about seventy-two miles southeast of Berlin by rail, and at the intersection of several important railway lines. The population, including the garrison, is 22,612.

KOTZEBUE, AUGUST FRIEDRICH FERDINAND VON, German dramatist, was born on May 3, 1761, at Weimar, where his father was a councilor of legation. Having attended the gymnasium of Weimar, he went in his sixteenth year to the university of Jena, and afterward studied about a year in Duisburg. Through the influence of Count Görtz, Prussian ambassador at the Russian court, he became secretary at St. Petersburg to the governor general, Von Baur, by whom he was recommended to the empress. In 1783 he received the appointment of assessor to the high court of appeal in Revel, where he married a daughter of Lieutenant-General Von Essen. He was ennobled in 1785, and became president of the magistracy of the province of Esthonia. Before leaving Germany he had published some unimportant writings; in Revel he acquired a considerable reputation by his *Leiden der Ortenbergischen Familie* (1785), his *Kleine Gesammelte Schriften* (1787–91), and his two plays, *Menschenhass und Reue* and *Die Indianer in England* (1787). The good impression produced by these works was almost effaced by a cynical book, *Doctor Bahrdt mit der eisernen Stirn*, which appeared with the name of Knigge on the title page. In 1798 he accepted the office of dramatist to the court theater of Vienna, resigning it in about two years with a pension of 1,000 florins. On his way to St. Petersburg, where his sons were being educated, he was arrested in April, 1800, and sent to Siberia. Fortunately he had written a comedy which flattered the vanity of Paul I.; and a translation of this play so delighted the emperor that Kotzebue was brought back, received an estate from the crown lands in Livonia, and was made director of the German theater in St. Petersburg. He returned to Germany when the emperor Paul died, and in 1802 was admitted into the Academy of Sciences at Berlin. He also wrote several plays in Berlin, and made some enemies by the bitterness with which he attacked Goethe. Toward the end of 1806 he was again settled in Russia, and in the security of his estate in Esthonia wrote many satirical articles against Napoleon in *Die Biene* and *Die Grille*. As councilor of state he was attached in 1816 to the department for foreign affairs in St. Petersburg, and in 1817 he went to Germany as a sort of spy in the service of Russia, with a salary of 15,000 rubles. In his weekly journal (the *Literarisches Wochenblatt*) he scoffed at the pretensions of those Germans who demanded free institutions, and became an object of such general dislike that he was obliged to leave Weimar for Mannheim. He was especially detested by young enthusiasts for liberty; and one of them, Karl Ludwig Sand, a theological student, formed a deliberate resolution to kill him. On March 23, 1819, Sand called at Kotzebue's house in Mannheim, and stabbed him to the heart, crying, "Here, thou betrayer of the Fatherland!" The assassin was executed, and the Government of Germany made his crime an excuse for placing the universities under strict supervision.

KOTZEBUE, OTTO VON, Russian navigator, son of the subject of last notice, was born at Revel on December 19, 1787. After his promotion to lieutenant, Kotzebue was placed in command of an expedition fitted out at the expense of the imperial chancellor, Count Rumantsoff, in the brig *Rurick*. In this vessel, with only twenty-seven men, Kotzebue set out on July 30, 1815, to find a passage across the Arctic Ocean, and explore the less known parts of Oceania. A severe attack of illness compelling him to return to Europe, he reached the Neva on August 3, 1818, bringing home with him a large collection of previously unknown plants and much new ethnological information. In 1823, Kotzebue, now a captain, was intrusted with the command of a new expedition, in two ships of war, the main object of which was to take reënforcements to Kamchatka. There was, however, a staff of scientific men on board, who collected much valuable information and material in geography, ethnography, and natural history. The expedition left Cronstadt on August 23d, and returned in July, 1826. Three years after his return from his second voyage, Kotzebue retired to his estate in Esthonia, where he died February 15, 1846.

KOUSSO, KOSSO, or CUSSO, a remedy for tapeworm. It consists of the flowers of *Hagenia abyssinica*, Willd., a handsome rosaceous tree, sixty feet high, growing throughout the table-land of Abyssinia, at an elevation of 3,000 to 8,000 feet above the sea-level.

KOVNO, a northwestern province of European Russia, is bounded on the northeast and southeast by the provinces of Courland and Vilna, and on the south and southwest by Russian Poland and by Prussia, a narrow strip touching the Baltic near Memel. It has an estimated area of 15,692 square miles. The level uniformity of its surface is broken only by two low ridges, which nowhere rise above 800 feet. Pop. (1898), 1,550,000.

KOVNO, the KAUNE of the Lithuanians, capital of the above government, is situated on the railway between St. Petersburg and Berlin, 503 miles southwest from the former. Population, 1898, 73,543. Its population is most varied; one half are Jews engaged in petty trades and commerce.

KOVROFF, a town in Russia, situated in the government of Vladimir, on the railway between Moscow and Nijni-Novgorod, forty miles east-northeast of the capital of the province, on the right bank of the Klazma river.

KOZELSK, a district town of the government of Kaluga in European Russia, situated forty-three miles southwest of Kaluga, on the left bank of the river Zhizdra. Population, 13,500.

KRAFFT, or KRAFT, ADAM, sculptor of the Nuremberg school, was born, probably at Nuremberg, about the middle of the fifteenth century, and died, some say in the hospital, at Schwabach, about 1507.

KRAJOVA, or CRAJOVA, a town in the circle of Dolschi, Roumania, is situated near the Schyl, a tributary of the Danube, about 110 miles west of Bucharest. In 1900 its population was 45,438.

KRANTZ, or Crantz, Albert, German historian, was a native of Hamburg, and was born about 1450, and died in 1517.

KRASNOYARSK, a town of eastern Siberia, capital of the extensive province of Yeniseisk, which stretches as a long strip from the Chinese frontier formed by the Sayan mountains to the shores of the Arctic Ocean. Population 1900, 27,500.

KREMENETZ, a district town of Russia, in the government of Volhynia, in the high valley of the Ikva, one of the tributaries of the basin of the Pripat, situated thirty miles east from Radziviloff, the great customhouse on the railway between Kieff and Lvoff. It is a poor place, the 15,800 inhabitants of which follow agriculture, raise tobacco, and excavate flint.

KREMENTCHUG, a Russian town in the government of Poltava, situated seventy-four miles by rail to the southwest of the government town, on the railway between Kharkoff and Nicolaieff, and on the left bank (here flat and sandy) of the Dnieper. Population 1900, 60,000.

KREMNITZ, a mining town in the cis-Danubian county of Bars, Hungary, lies in a deep valley, and on the Hungarian state railway, eighty-two miles north of Budapest. Population about 10,000.

KREMSIER, chief town of a district in Moravia, Austria, is situated in the fertile region of Hanna on the March, about twenty-five miles southwest of Olmütz. Population about 12,000.

KREUTZER, Conradin, German musical composer, owes his permanent fame almost exclusively to one opera, *Das Nachtlager von Granada*, which has kept the stage for nearly half a century in spite of the changes of taste. He was born November 22, 1782, at Mösskirch in Baden. He died December 14, 1849, at Riga, where he had accompanied his daughter Cecilia Kreutzer, a singer of some renown.

KREUZNACH, or Creuznach, chief town of a circle in the government district of Coblentz, Prussia, is situated on the Nahe, a tributary of the Rhine, about forty miles southeast of Coblentz. The population in 1900 was about 21,772.

KRILOFF, Kruiloff, or Kryloff, Ivan Andreevitch, the great national fabulist of Russia, was born February 14, 1768, at Moscow. His death took place November 21, 1844. His statue in the Summer Garden is one of the finest monuments in St. Petersburg.

KRISHNAGAR, town and headquarters of Nadiyá district, Bengal, India, situated on the left bank of the Jalangí river. The municipal limits comprise an area of seven square miles, and a population, in 1899, of 30,750 persons.

KROLEVETZ, a district town of Russia, in the government of Tchernigoff, 108 miles east of the government town. It has 14,000 inhabitants.

KROTOSCHIN, chief town of a circle in the government district of Posen, Prussia, is situated about thirty-two miles southwest of Posen.

KRÜDENER, Barbara Juliana von Wietinghoff, Baroness von, authoress of the romance of *Valérie*, but better known by the religious fervor and pious mysticism of her later years, was born of noble and wealthy parents at Riga, November 21, 1766. She died at Karasu-Bazar on December 25, 1824.

KRUMEN, Croomen, Krus, or Croos, a negro people on the west coast of Africa. The name is properly Kra or Krao, though the corrupt form, Crew-men, has sometimes been put forward as the original. Ethnographically it ought to be confined to the tribes settled in the neighborhood of the Sinoe in the republic of Liberia, where their chief towns are known as Settra Kru, Little Kru, and Nana Kru; but, as they were the first west African people who ventured to take service on board European vessels, it is now generally applied to about a score of tribes living along 200 miles of coast who in this respect have followed their example.

KRUMMACHER. Three members of this family have attained some popularity as religious writers in Germany and indeed throughout Reformed Protestant Christendom.

1. Friedrich Adolf Krummacher was born July 13, 1768, at Tecklenburg, Westphalia; studied theology at Lingen and Halle, and became successively rector of the grammar school at Mörs, professor of theology at Duisburg, preacher at Crefeld and afterward at Kettwich, consisto-rialrath and superintendent in Bernburg, and pastor of the Ansgariuskirche in Bremen (1824), where he died on April 14, 1845. He was the author of numerous religious works, but is best known by his *Parabeln*, first published in 1805, which have gone through numerous German editions (ninth ed., Essen, 1876), and have been translated into English and other European languages.

2. Gottfried Daniel Krummacher, born at Tecklenburg, April 1, 1774, was pastor successively in Bärl, Wulfrath, and Elberfeld. He was the leader of the "pietists" of Wupperthal, and published several volumes of sermons, including one entitled *Israel's Wanderings*. His death occurred on January 30, 1837.

3. Friedrich Wilhelm Krummacher, son of Friedrich Adolf, was born at Mörs, January 28, 1796, studied theology at Halle and Jena, and became pastor successively at Ruhrort (1823), and Gemarke, near Barmen (1825). In 1847 he received an appointment to the Dreifaltigkeitskirche in Berlin, and in 1853 he became court preacher at Potsdam. He died December 10, 1868. F. W. Krummacher was an influential promoter of the Evangelical Alliance.

KRUSENSTERN, Adam John, Russian navigator, hydrographer, and admiral, was born in Esthonia on November 8, 1770. Having published a paper pointing out the advantages of direct communication between Russia and China by Cape Horn and the Cape of Good Hope, he was appointed by the emperor Alexander to make a voyage to the east coast of Asia to endeavor to carry out the project. Two English ships were bought, Krusenstern commanding the one and Lisiansky the other. Leaving Cronstadt in August, 1803, Krusenstern proceeded by Cape Horn and the Sandwich Islands to Kamchatka, and thence to Japan. Returning to Europe by the Cape of Good Hope, after an extended series of explorations, Krusenstern reached Kronstadt in August, 1806, his being the first Russian expedition to circumnavigate the world. He died at Revel, August 24, 1846.

KUBA, or Kudial-kala, a town of the Caucasus, in the government of Baku, Russia, 120 miles northwest from Baku, and twenty-five miles west of the Caspian. Its situation at the foot of the highlands of Caucasus, on a plain watered by the numberless branches into which the Kubinka river and other smaller streams divide at their issue from the mountain valleys, makes the neighborhood very suitable for gardening, which is the chief occupation of the 11,300 inhabitants of Kuba, mostly Mussulman Shiites.

KUBAN, a Russian district and government at the northwest extremity of the Caucasus, comprising the entire basin of the river of that name. It is bounded on the north by the lands of the Don Cossacks and the steppes of Stavropol, east by the watershed of the river basins of the Caspian and the sea of Azoff, south and southwest by the Caucasian Alps, and west by the Black Sea and Straits of Kertch. Its area comprises 27,728 square miles. Ekaterinodar, the chief town (population, 30,000), is the residence of the governor, who, being also ataman in chief of the Kuban Cossacks, is invested with military and civil power.

KUBLAI KHAN (or KAAN, as the supreme ruler descended from Jenghiz was usually distinctively termed in the thirteenth century) was the most eminent of the successors of Jenghiz (Chinghiz), and the founder of the Mongol dynasty in China. He was the second son of Tuli, youngest of the four sons of Jenghiz by his favorite wife. Jenghiz was succeeded in the khanship by his third son Okkodai, or Ogdai (1229), he by his son Kuyuk (1246), and Kuyuk by Mangku, eldest son of Tuli (1252). Kublai was born in 1216, and, young as he was, took part with his younger brother Hulaku (afterward conqueror of the caliph and founder of the Mongol dynasty in Persia) in the last campaign of Jenghiz (1226-27). The Mongol poetical chronicler, Sanang Setzen, records a tradition that Jenghiz himself on his deathbed discerned young Kublai's promise and predicted his distinction.

Northern China, Cathay as it was called, had been partially conquered by Jenghiz himself, and the conquest had been followed up till the Kin or "golden" dynasty of Tartars, reigning at Kai-fung-fu on the Yellow river, were completely subjugated (1234). But China south of the Great Kiang remained many years later subject to the native dynasty of Sung, reigning at the great city of Linggan, or Kinsai, now known as Hang-chow-fu. Operations to subdue this region had commenced in 1235, but languished till Mangku's accession. Kublai was then named his brother's lieutenant in Cathay, and operations were resumed. By what seems a vast and risky strategy, of which the motives are not quite clear, the first campaign of Kublai was directed to the subjugation of the remote western province of Yunnan. After the capture of Talifu (well known in recent years as the capital of a Mohammedan insurgent sultan) Kublai returned north, leaving the war in Yunnan to a trusted general. Some years later (1257) the khan Mangku himself entered on a campaign in west China, and died there, before Ho-chow in Sz'chuen (1259).

Kublai assumed the succession, but it was disputed by his brother Arikbugha, and by his cousin Kaidu, and wars with these retarded the prosecution of the southern conquest. Doubtless, however, this was constantly before Kublai as a great task to be accomplished, and its fulfillment was in his mind when he selected as the future capital of his empire the Chinese city that we now know as Peking. Here, in 1264, to the northeast of the old city, which under the name of Yenking had been an occasional residence of the Kin sovereigns, he founded his new capital, a great rectangular plot of eighteen miles in circuit. The (so-called) "Tartar city" of modern Peking is the city of Kublai, with about one-third at the north cut off, but Kublai's walls are also on this intrenched portion still traceable.

The new city, officially termed Tai-tu ("great court"), but known among the Mongols and western people as Kaan-baligh, was finished in 1267. The next year war against the Sung empire was resumed, but was long retarded by the strenuous defense of the twin cities of Siang-yang and Fan-ching, on opposite sides of the river Han, and commanding two great lines of approach to the basin of the Great Kiang. The siege occupied nearly five years. After this Bayan, Kublai's best lieutenant, a man of high military genius and noble character, took command. It was not, however, till 1276 that the Sung capital surrendered, and Bayan rode into the city (then probably the greatest in the world) as its conqueror. The young emperor, with his mother, was sent prisoner to Kaan-baligh; but two younger princes had been dispatched to the south before the fall of the city, and these successively were proclaimed emperor by the adherents of the native throne. An attempt to maintain their cause was made in Fuh-keen, and afterward in Canton province; but in 1279 these efforts were finally extinguished, and the faithful minister who had inspired them terminated the struggle by jumping with his young lord into the sea.

Even under the degenerate Sung dynasty the conquest of southern China had occupied the Mongols during intermittent campaigns of half a century. But at last Kublai was ruler of all China, and probably the sovereign (at least nominally) of a greater population than had ever acknowledged one man's supremacy. For, though his rule was disputed by the princes of his house in Turkestan, it was acknowledged by those on the Volga, whose rule reached to the frontier of Poland, and by the family of his brother Hulaku, whose dominion extended from the Oxus to the Arabian desert. For the first time in history the name and character of an emperor of China were familiar as far west as the Black Sea, and not unknown in Europe. The Chinese seals which Kublai conferred on his kinsmen reigning at Tabriz are stamped upon their letters to the kings of France, and survive in the archives of Paris. Adventurers from Turkestan, Persia, Armenia, Byzantium, even from Venice, served him as ministers, generals, governors, envoys, astronomers, or physicians; soldiers from all Asia to the Caucasus fought his battles in the south of China. Once in his old age (1287) Kublai was compelled to take the field in person against a serious revolt, raised by Nayan, a prince of his family, who held a vast domain on the borders of Manchuria. Nayan was taken and executed. The revolt had been stirred up by Kaidu, who survived his imperial rival, and died in 1301. Kublai himself died in 1294, at the age of seventy-eight.

KUCHÁN (a contracted form of *Kabushán*), a walled town and also a district of Persia, province Khórásán, inclosed north and south by the Hazar-Mazjíd and Ala-Dagh mountains. The town lies at the north foot of the Shah Jahan Kuh, about eighty miles northwest of Meshhed on the route to Shirván. It is an important place, seat of a district governor, and surrounded by extensive gardens and vineyards yielding excellent fruits and grapes from which a superior wine is made. Population about 25,000.

KUCH BEHAR, or COOSH BEHAR, a native state in Bengal, India. It is entirely surrounded by British territory, being bounded on the north by Jalpáigurl, on the east by Goálpára, on the south by Rangpur, and on the west by Purniah districts. The state forms a level plain of triangular shape, intersected by numerous rivers. The greater portion is fertile and well cultivated, but tracts of jungle are to be seen in the northeast corner, which abuts upon Assam. Population (1901), 600,000; area, 1,307 sq. miles.

KUEN-LUN, or KOUEN-LUN, the name given to the mountains between western Tibet and the plains of eastern Turkestan; it is derived from the Chinese geographers, and is probably a corruption of some Turkish or Tibetan word; it appears to be unknown locally. The name having been adopted, chiefly on the initiative of Humboldt, before any correct geographical knowledge had been obtained of the region to which it was applied, it has been used with inconvenient want of precision, and this has encouraged erroneous conceptions. Little precise information is yet available on the subject, but there is no reason to doubt that, within the limits to which actual exploration has gone, the mountains designated as Kuen-lun form the northern border of the high lands of Tibet, descending to the central Asian plain, just as those commonly spoken of under the name of Himalaya constitute the broad mountainous slope which descends to the lower levels of India.

KUKA, or KUKAWA, the capital of the kingdom of Bornu in Central Africa, is situated four and one-half miles from the western shores of Lake Tsad, or Chad, in the midst of an extensive and, for the most part, uncultivated plain. Population about 7,500.

KUKU KHOTO, in Chinese KWEI-HWA-TCHENG, or GUI-HUA-TCHENG, a city of the Chinese province of Shan-se, situated to the north of the Great Wall, about 160 miles west of Kalgan. It lies in the valley of a small river which joins the Hoang-ho fifty miles to the south.

KULDJA, the name of two towns in the valley of the Ili, in Central Asia, situated about twenty-five miles apart.

KU-KLUX KLAN, a secret organization which, said to have been founded in 1866 at Pulaski, Tenn., originally for purposes of amusement only, soon developed into an association of "regulators," and became notorious for the lawless deeds of violence performed in its name. The proceedings of the Ku-Klux in the southern states were only one feature of the determined struggle to withhold from the emancipated slaves the right of voting. The outrages and murders which convulsed the country in 1868–69 ended in the calling out of troops and the formal disbandment of the society in March of the latter year; but its name and often its disguises were used for years after.

KULLU, a valley and subdivision of Kángrá district, Punjab, India. Kullu Proper, north of the Sainj, together with Inner Seoráj, forms a great basin or depression in the midst of the Himálayan systems, having the narrow gorge of the Bias at Sárgi as the only outlet for its waters. North and east the Bára Bangahál and Mid-Himálayan ranges rise to a mean elevation of 18,000 feet, while southward the Jalori and Dháoladhar ridges attain a height of 11,000 feet. The greater portion of Kullu must thus ever remain an utter wilderness.

KULM, chief town of a circle in the government district of Marienwerder, Prussia, is situated on the high banks of the Vistula, about twenty-four miles northwest of Thorn.

KULMBACH, or CULMBACH, a town in the administrative district of Upper Franconia, Bavaria, is picturesquely situated on the White Main, and on the Bamberg-Hof line of the Bavarian State Railway, about eleven miles northwest from Baireuth. The town has several linen manufactories and a large cotton spinnery, but is chiefly famed for its many extensive breweries, the latest returns showing an annual production of 4,115,637 gallons of beer, of which 3,719,478 gallons were exported. Population (1901), about 10,000.

KUM, a walled city of Persia, in the province of Irak-Adjemi, in a hilly district at the western edge of the Great Salt Desert, eighty-five miles south of Teheran on the main route to Ispahan, and at the northern extremity of the lofty Kuru-Kuh range, which runs thence for over 600 miles southeast to the Bam highlands. It is a long, straggling, half-ruined place, with empty bazars, and neglected streets full of holes and pitfalls. Yet it ranks second to Meshhed in sanctity, thanks to the famous shrine of Masuma Fatima, sister of the imám Riza, which also contains the remains of ten kings and four hundred and forty-four "saints," and whose gilded copper dome has been completed by the present shah. Like Kerbela, Kum is a favorite place of interment for the faithful, and is yearly visited by thousands of devout Shiah pilgrims. Population estimated at 20,000.

KUMAUN, a district in the Northwestern Provinces of India, consists of two distinct tracts—the sub-Himalayan ranges, and the *bhábhar* or waterless forest, averaging from ten to fifteen miles in breadth, which stretches between the forests and the Tarái. (See HIMALAYA.) Of the entire area of the highlands, only 500 square miles are returned as cultivated and 100 square miles as cultivable.

KUMPTA, or COOMPTAH, a town and port in North Kánara district, Bombay, India, with a population in 1890 of 15,932. It is the chief commercial town in the district.

KUNCH, a town in the Northwestern Provinces of India, with a population in 1901 of about 20,000.

KUNGUR, a district town of Russia, in the government of Perm, fifty-eight miles south-southeast of the capital of the government, on the Sylva, a tributary of the Tchusovaya. Population, 10,800.

KURDISTAN is a convenient geographical designation for the lands inhabited by the Kurds, but the name is not used in the country in this general sense, nor indeed would it be technically correct, for in a very small portion only of the region in question is the population exclusively Kurdish.

The furthest point to which the Kurds extend northwest is the junction of the two arms of the Euphrates near Kharpút, while their southeastern limit may be defined as the frontier of Luristan, south of Kirmánsháhán. The whole of this space, which is roughly calculated to embrace an area of at least 60,000 square miles, is mountainous, being in fact a section of the great chain which, known in antiquity at one extremity as Taurus and at the other as Zagrus, bisects Asia Minor from west to east, and then turning to the southeast buttresses the great Persian plateau in a series of ranges rising step over step above the valley of the Tigris.

There are no means of calculating the total Kurd population with even approximate accuracy, for neither in Turkey nor in Persia has a government census ever been attempted, and the revenue tables which regulate taxation and conscription, and ought therefore to guide inquiry, are willfully distorted for political purposes to such an extent as to be quite unreliable. From the materials, however, which have been recently collected by the British consular officers employed in Asia Minor, with a view of testing the relative strength of the Mohammedan and Christian populations, it seems pretty clear that the Turkish Kurds exceed one million and a half in number, while the estimates of travelers who have resided in Persian Kurdistan give about 750,000 souls for the aggregate of the tribesmen and sedentary Kurds dwelling along the mountains from Ararat to Kirmánsháhán, together with the scattered colonies of the interior.

The Kurds generally bear a very indifferent reputation, a worse reputation, perhaps, than they really deserve. Being aliens to the Turks in language and to the Persians in religion, they are everywhere treated with mistrust, and live as it were in a state of chronic warfare with the powers that be. Such a condition is not, of course, favorable to the development of the better qualities of human nature. The Kurds are thus wild and lawless; they are much given to brigandage; they oppress and frequently maltreat the Christian populations with whom they are brought in contact—these populations being the Armenians in Diarbekir, Erzeroum, and Van, the Jacobites and Syrians in the Jebel-Túr, and the Nestorians and Chaldæans in the Hakkári country—but they are not as a general rule either fanatical or cruel. In the Hakkári country, indeed, they live, under ordinary circumstances, in perfect amity with the Nestorians, from whom in outward appearance they are hardly distinguishable. It must be added, too, that they are naturally brave and hospitable, and in common with many other Asiatic races possess certain rude but strict feelings of honor. Perhaps the most distinguishing characteristic of the Kurdish chief is pride of ancestry This feeling is in many cases exaggerated, for in reality the present tribal organization does not date from any great antiquity. In the list indeed of eighteen principal tribes of the nation which was drawn up by the Arabian historian Massoudi, in the tenth century, only two or three names are to be recognized at the present day. A fourteenth century list, however, translated by Quatremère, presents a great number of identical names, and there seems no reason to doubt that certain families both in Bohtán and Hakkári, which are extant at the present day, can really trace their descent from the Ommeyide caliphs, while the Babán chief of Sulimaníeh, representing the old Sohrans, and the Ardelán chief of Sinna, who also represents an elder branch of the Guráns, each claim an ancestry of at least 500 years. There was up to a recent period no more picturesque or interesting scene to be witnessed in the East than the court of one of these great Kurdish chiefs, where, like another Saladin, the bey ruled in patriarchal state, surrounded by an hereditary nobility, regarded by his clansmen with reverence and affection, and attended by a bodyguard of young Kurdish warriors, clad in chain armor, with flaunting silken scarfs, and bearing javelin, lance, and sword as in the time of the crusades.

The present Kurdish language, which is called Kermánjí—a title difficult to explain—is an old Persian patois, intermixed to the north with Chaldæan words and to the south with a certain Turanian element which may not improbably have come down from Babylonian times.

The religion of the Kurds also furnishes a very curious subject of inquiry. The great body of the nation, in Persia as well as in Turkey, are Sunnis of the Shafe'í sect, but in the recesses of the Deyrsim to the north and of Zagrus to the south, there are large half-pagan communities, who are called indifferently Ali-Ollahi and Kizzil-básh, and who hold tenets of some obscurity, but of considerable interest. Outwardly professing to be Shí'ahs or "followers of Ali," they observe secret ceremonies and hold esoteric doctrines which have probably descended to them from very early ages, and of which the essential condition is that there must always be upon the earth a visible manifestation of the Deity. While paying reverence to the supposed incarnations of ancient days, to Moses, David, Christ, Ali and his tutor Salmán-el-Farsi, and several of the Shí'ah imams and saints, they have thus usually some recent local celebrity at whose shrine they worship and make vows; and there is, moreover, in every community of Ali-Ollahis some living personage, not necessarily ascetic, to whom, as representing the Godhead, the superstitious tribesmen pay almost idolatrous honors. Under the caliphs of Bagdad the Kurds were always giving trouble in one quarter or another.

KURGAN, a district town of western Siberia, in the government of Tobolsk, 352 miles south-southwest of the capital of the province, on the left bank of the Tobol river.

KURILE ISLANDS, a chain of islands to the northeast of Asia, extending for about 795 miles from the southern extremity of the peninsula of Kamchatka to the northern extremity of Yezo, and forming the boundary between the Sea of Okhotsk and the outer ocean. Till 1875 the Little or Northern Kuriles belonged to Russia, and the Great or Southern Kuriles to Japan, but by the treaty of that date they were all recognized as Japanese. The principal islands, beginning at the north, are Shumshu (226 square miles), Paramushir (1,135), Onekotan (244), Kharimkotan Si Musir (161), Matua, Urup (563), Iturup (2,656), and Kunashir. Like the peninsula of Kamchatka, the whole chain is of volcanic origin, and several of the islands—Yekarma, Musir, Raikoke, Matua, Iturup—are still centers of volcanic activity.

KURRACHEE, or KARÁCHI, a district in Sind, India, with an area of 14,091 square miles, and a population of 426,722.

KURRACHEE, or KARÁCHI, the chief town, is situated at the extreme northern end of the Indus delta.

The census of 1901 returned the inhabitants of Kurrachee, including the cantonment, at 115,407.

KURSK, a government of European Russia conterminous with those of Tchernigoff, Orel, Voronezh, Poltava, and Kharkoff, and estimated to have an area of 17,937 square miles. The surface is irregular and even hilly, but the highest point (near the town of Tim) does not exceed 1,016 feet of absolute elevation.

KURSK, the chief town of the above government, is situated 333 miles south of Moscow, at the confluence of the Kur with the Tuskor, and forms the meeting place of the railways from Moscow, Kieff, and Kharkoff. The inhabitants number more than 30,000, or, including the suburbs (1899), 54,000.

KUSTENDJE, or KÜSTENDJIE, a seaport of Roumania on the coast of the Black Sea, 140 miles east of Bucharest, the terminus of the railway from Tchernavoda on the Danube, and the principal outlet for the produce of the Dobrudja. Population, 5,600.

KUSTRIN, or CÜSTRIN, a town and fortress of the first rank in the circle of Königsberg-in-der-Neumark, in the government district of Frankfort, Prussia, is situated at the confluence of the Oder and Warthe, about fifty-one miles northeast of Berlin by rail. It consists of the town proper within the strong fortifications, a suburb on the left bank of the Oder, and one on the right bank of the Warthe. There are bridges over both rivers. The population in 1901 was 18,227.

KUTAIAH, KUTAYA, or KIUTAHIA, the chief town of a sandjak in the vilayet of Khudavendikiar, Asia Minor, is situated on the Pursak, an affluent of the Sakaria, the ancient Sangarius. The town lies at an important point of the great road across Asia Minor from Constantinople to Aleppo. It has a busy trade, and a population variously estimated at from 40,000 to 60,000. Kutaiah has been identified with Cotiæum.

KUTAIS, a town of the Caucasus, Russia, capital of the province of same name, sixty miles east from Poti, and four miles from the Rion station of the railway between Poti and Tiflis. During recent years Kutais has acquired some importance, and its population is rapidly increasing; it is now 12,000.

KUTTENBERG, chief town of an official district in central Bohemia, Austria, is situated on a small stream in a fertile region, about 180 miles northwest of Vienna by rail. The population is about 15,000.

KUTY, a municipal town in the Austrian province of Galicia, lies twenty miles southeast of Kolomea, and on the left bank of the Czeremosz, which here forms the boundary between Galicia and Bukowina. Population about 12,000.

KUZNETSK, a district town of Russia, in the government of Samara, situated on the railway between Samara and Penza, 158 miles west of the former. Population about 20,000.

KYOUK-HPYU, a district in British Burmah, consists of, first, a strip of mainland along the Bay of Bengal, extending from the An Pass, across the main range, to the Ma-í river, and, secondly, the large islands of Ramri and Man-oung, with many others to the south, lying off the coast of Sandoway. In 1901 the population was 200,000.

L.

L represents probably the same sound in all alphabets. That sound used to be called a "liquid," in which class *m*, *n*, and *r* were included. This arrangement was unsatisfactory so far as *m* and *n* are concerned, for they have nothing common in their formation with the others. But *r* and *l* are very closely akin. They are both dentals—or more accurately front palatals—produced by raising the point of the tongue to the front part of the palate, immediately behind the gums. They differ in this: for *r* a small aperture is left over the tip of the tongne by which the air escapes; but for *l* the tongue reaches the top of the palate, but does not rest (as for *r*) against the sides of the mouth, and the voice escapes laterally by these side-apertures. The slightness of the difference in the positions of the mouth for these two sounds explains their exchangeableness.

LA BADIE, LABADISTS. Jean de la Badie, a noted Pietist leader in the seventeenth century, was the son of Jean Charles de la Badie, governor of Guyenne; he was born in the town of Bourg, not far from Bordeaux, on February 13, 1610, and died in Altona on February 13, 1674. The study of Calvin's *Institutes* taught him that he had more in common with the Reformed than with the Roman Catholic Church, and after various adventures he joined the Reformed Church of France at Montauban in 1650. His fame had preceded him, and his accession to the ranks of the Protestants was deemed a great triumph; no such man since Calvin himself, it was said, had left the Roman Catholic Church. He was called to the pastorate of the church of Orange, on the Rhone, and at once became noted for the severity of the discipline he exercised. At Middleburg, at the head of his separatist congregation, De la Badie developed his views for a reformation of the Reformed Churches: the church is a communion of holy people who have been born again from sin; baptism is the sign and seal of this regeneration, and is to be administered only to believers; the Holy Spirit guides the regenerate into all truth, and the church possesses throughout all time those gifts of prophecy which it had in the ancient days; the community at Jerusalem is the continual type of every Christian congregation, therefore there should be a community of goods, the disciples should live together, eat together, dance together; marriage is a holy ordinance between two believers, and the children of the regenerate are born without original sin; marriage with an unregenerate person is not binding. The life and separatism of the community brought them into frequent collision with their neighbors and with the magistrates of Middleburg, and in 1670 they accepted the invitation of the princess Elizabeth, abbess of Herford in Westphalia, to take up their abode within her territories, and settled down in Herford to the number of about fifty. Not finding the rest they expected, however, they migrated to Altona in 1672, where they were dispersed on the death of the leaders. Small communities also existed in the Rhineland, and a missionary settlement was established in New York.

LABARUM, the sacred military standard of the early Christian Roman emperors, was first adopted by Constantine the Great after his miraculous vision in 312, although, according to Gibbon, he did not exhibit it to the army till 323. The name seems to have been known before, and the banner itself was simply a Christianized form of the Roman cavalry standard. The derivation of the word labarum is disputed; modern scholarship inclines to recognize its etymon in the Basque *labarva*, signifying standard.

LABEO, MARCUS ANTISTIUS (*cir.* 50 B.C.–18 A.D.), was the son of Pacuvius Antistius Labeo, a jurist of minor note, who caused himself to be slain after the defeat of his party at Philippi. A member of the plebeian nobility, and in easy circumstances, the younger Labeo entered early upon public life, and soon rose to the prætorship; but his undisguised antipathy to the new régime, and the somewhat brusque manner in which in the senate he occasionally gave expression to his republican sympathies—what Tacitus calls his *incorrupta libertas*—proved an obstacle to his advancement, and his rival, Ateius Capito, who had unreservedly given in his adhesion to the ruling powers, was unfairly promoted by Augustus to the consulate, when, in ordinary course, the appointment should have fallen to Labeo; the result was that, smarting under the wrong that was done him, he declined to accept the office when it was offered to him in a subsequent year. From this time he seems to have abandoned politics, and devoted his whole time to jurisprudence, with which his name is much more prominently connected. His training in the science had been derived principally from Trebatius Testa, although he had also diligently attended the public audiences of most of the more eminent lawyers of the later years of the republic. To a profound knowledge of the law as he had received it from them he added a wide general culture, devoting his attention specially to dialectics, philology, and antiquities, as valuable aids in the exposition, expansion, and application of legal doctrine. Down to the time of Hadrian his was probably the name of greatest authority; and the fact that several of his works were abridged and annotated by later hands testifies to the estimation in which they were held by practitioners. While Capito is hardly ever referred to, the dicta of Labeo are of constant recurrence in the writings of the classical jurists, such as Gaius, Ulpian, and Paul; and no inconsiderable number of them were thought worthy of preservation in Justinian's *Digest*.

LABERIUS, DECIMUS, a Roman knight and a prolific writer of *mimi*, or farces, was born about 105 B.C. Of his life we know little. Laberius died at Puteoli in January 34, B.C. He was the chief of those who introduced the mimus into Latin literature toward the close of the republican period.

LABIENUS, TITUS, Julius Cæsar's proprætor in Gaul, first attracted his leader's favor in a civil capacity. In 63 B.C. he appeared at Cæsar's instigation as the prosecutor of Rabirius for perduellio; and in the same year, being tribune of the plebs, he carried a plebiscitum that indirectly secured for Cæsar the dignity of pontifex maximus. The military talent of Labienus was respectable, though not brilliant; but of all the officers trained under Cæsar in his Gallic campaigns he was the most trusted. His chief exploits in Gaul were the defeat of the Treviri under Indutiomarus in 54 B. C., his expedition against Lutetia (Paris) in 52 B. C., and his victory over Camologenus and the Ædui in the same year. In 50 B. C. he was left in command of Gallia Cisalpina, while Cæsar returned to the north; but, on the outbreak next year of the civil war between Cæsar and Pompey, Labienus was one of the first to desert Cæsar. The ill fortune of Labienus under Pompey was as marked as his success had been under Cæsar's auspices. From the defeat at Pharsalia, to which he had contributed by affecting to despise his late comrades, he fled to Africa. There, indeed, he was able by mere force of numbers to inflict a slight check upon Cæsar at Ruspina in 45 B. C.; but when the defeat at Thapsus ruined the Pompeian party in Africa, Labienus withdrew to join the younger Pompey in Spain. At Munda, on March 17, 45 B. C., he again met Cæsar, and in the ensuing defeat of his party fell sword in hand.

LABOR AND LABOR LAWS.

With some exceptions in the case of labor imposed as a punishment for crime or as a test or condition of aid to the poor under the poor laws, the labor here to be spoken of is labor by freemen—that is to say, labor by persons having the primary right to choose whether they will labor or not, and to choose the terms on which they will consent to labor, if labor be their choice.

In every age and country, until times comparatively recent, compulsory personal servitude appears to have been the lot of a large, perhaps the greater, portion of mankind. The slave was a man who had been captured in war or procured by purchase, or who had surrendered himself to the dominion of another as the alternative of starvation or in discharge of a debt, and it was his hands that tilled the soil, dug the mine, wove the cloth, and built the walls in ancient Greece and Italy. It has been asserted that in the early state of Rome the proportion of slaves, who were valued as property, was more considerable than that of hired servants, who could be computed only as an expense. It was thought more for the interest of the merchant or manufacturer to purchase than to hire his workmen, and in the country slaves were employed as the cheapest and most laborious instruments of agriculture. On the other hand, it has been inferred from our scanty materials that, as the Roman empire extended, the agricultural laborer and the citizen in Spain, Gaul, and Britain, in Syria and Egypt, maintained himself, as in the present day, by his own labor and that of his household, without the aid of any slave; but this is probably too favorable a picture. In the decline of the Roman empire, Roman captives were taken home by their northern conquerors. The useful craftsmen—smiths, carpenters, workmen in the metals, shoemakers, tailors, dyers, and others—employed their skill for the use or profit of their masters; while those who were destitute of art but capable of labor were condemned, without regard to their former rank, to tend the cattle and cultivate the lands of the victors. This, however, was only turning the tables on the Romans, for capture in war forms one of the principal sources of supply of slaves wherever slavery exists.

The Germans, in their primitive settlements, were accustomed to the notion of slavery, incurred, not only by captivity, but by crimes, by debt, and the wager of personal liberty in gaming. In the glimpses we get of the conditions of labor elsewhere the same essential features are discernible. In the changes of time and of geographical area of observation the harsher word slave may disappear; yet the thing not only survived the introduction of Christianity, but was long regarded as not inconsistent with it, and was recognized as a national institution in civilized Europe. Whether under the name of slavery or serfdom, or without either name, north, south, east, and west, an absolute right, apart from contract, to earnings and to the person of the laborer was accepted, if not openly vindicated. In looking at the present day at the vestiges of man's former and most permanent handiwork, it is instructive to regard them with an eye to the distinctions between periods of forced and voluntary labor. The pyramids of Egypt and the wall of China are monuments of slave labor; and the same is the case with the classic remains at Athens and Rome, so far at least as relates to the labor involved in the quarrying and hewing of stone, and the making of bricks and placing them in position. As regards Britain, our knowledge is too slight, and the conjectures as to the origin and objects of such structures as Stonehenge and Avebury are too varied to allow of positive assertion; but it seems legitimate to conclude that the labor was forced. British and Roman camps and earthworks for military purposes probably exhibit the result of organized military labor combined with the forced labor of the inhabitants of the district. In this aspect the fortresses and defenses destined for use consequent on the campaigns of a Cæsar or a Napoleon, of an Alexander or a Clive, do not materially differ. The remains still to be seen of Agricola's works on the line between the Firths of Clyde and Forth, as well as of the Roman walls and roads throughout England, the later but rude gigantic earthwork of the Mercian king between England and Wales, may be regarded as fruits of slave labor. The stupendous aqueducts of Roman brickwork in various parts of southern Europe are naturally compared with the viaducts of the present age. The comparison may well extend to the accompanying conditions of labor.

Passing over the general effect of serfdom throughout northern Europe, and of the gradual manumission of toilers, as only a minute part of a very large subject, and directing our attention to the conditions of ordinary daily labor in the earliest period of the history of the British islands, we find it necessary to classify labor in relation to its particular application.

At the present day the most obvious natural distinction to be observed in this connection is that between the labor of the husbandman on the one hand and the labor of the mechanic and artisan on the other, a distinction to some extent parallel with a division into rural and urban labor. In an attempted division of labor in Great Britain recorded in writing, which, although not in its present form earlier than the fifteenth century, and distorted by a fanciful notion of adapting everything to triads, probably gives us a knowledge of a very primitive people, the following divisions of labor are found: — (1) domestic art, with its three primary branches—husbandry or cultivation of land, pastoral cares, and weaving; (2) mechanical arts—smithcraft, carpentry, and stone-masonry.—*Ancient Laws, etc., of Wales*, 1841.

The social status of these various laborers is a very difficult question. It seems clear that the heads of departments of labor, although working for the lord or chief, were freemen. The authority just cited expressly says that smiths, stonemasons, and carpenters had equal privileges, and everyone following those trades was entitled, besides his maintenance and firing, to a fixed measure of land for cultivation, independently of what he might have by birthright. It is clear that there must have been subdivisions, as in the present day, between craftsmen and laborers engaged in the same trade, as between a mason and his laborer, between a plowman and the driver of the team, and between the shepherd responsible for the flock and the cowherd who merely drove cattle to and from the pasture; a freeman might perform one branch of duty and an absolute slave or serf another on the same land, and for the same chief or head. It cannot be denied that slavery in the strictest sense was an institution among the Saxons in England, and that in the earliest English laws such slaves are found, but the true slave class was a small one, and it has been doubted whether the labor of an ordinary serf was practically more severe or the remuneration in one form or another much less, than that of an agricultural laborer in some parts of England at this day. On the other hand, a fully qualified freeman might be a simple husbandman.

Of the main conditions of labor at an early period in English towns we have no details. With the gradual development of urban populations around the castle of the lord, it is improbable that in any great number of cases the inhabitants long continued in the condition of personal serfage. The city populations of this island had not the habit and use of slavery. Serfs and oppressed laborers from adjacent estates may have been glad to take refuge from taskmasters more than ordinarily severe, but there is no doubt that freemen gradually united with them under the lord's protection, that strangers engaged in trade sojourned among them, and that a race of artisans gradually grew up in which original class feelings were greatly modified. From these and other causes the distinctions between agricultural laborers and mechanics and artisans grew and became permanent.

An act was passed in the reign of Richard II. (1388, 12 Richard II.) by which no servant or laborer, whether man or woman, could depart out of the hundred to serve elsewhere, unless bearing a letter patent under the king's seal, expressing the cause of going and the time of return. Wages were fixed in a way that shows the classification of agricultural labor. The "bailiff for husbandry" stands first. The "master hine," the carter, and the shepherd are on an equality; the plowman follows; after him the oxherd and cowherd, then the swineherd, the dairymaid and other women receiving equal wages, and every other laborer and servant according to his degree; no servant of artificers is to take more than the servants and laborers above named after their estate. The givers and takers forfeited the excess, or double or treble if attainted before; "and, if the taker so attainted have nothing whereof to pay the said excess, he shall have forty days' imprisonment." This was followed by a remarkable clause: "Also it is ordained and assented that he or she which useth to labor at the plow and cart, or other labor or service of husbandry, till they be of the age of twelve years, shall from thenceforth abide at the said labor, without being put to any trade or handicraft; and, if any covenant or bond of apprenticeship be from henceforth made to the contrary, the same shall be holden for none." By a statute of the following year (13 Richard II.), the justices were to settle and proclaim between Easter and Michaelmas what should be the wages of day laborers.

Early in the fifteenth century we have a glimpse of something beyond this continued legislation interfering with freedom of labor, in a reservation in favor of children being sent to school. An act of 7 Henry IV., putting a property qualification on apprenticeship and requiring children to be put to such labor as their fathers or mothers are of, or as their estates require, on penalty of one year's imprisonment, fine, and ransom, and of one hundred shillings for receiving such apprentices, has this sentence: "But any person may send their children to school to learn literature." Laborers and artificers are to be sworn to observe the statutes in force or be put in the stocks, and a penalty is imposed on towns neglecting to have stocks. In 1414, by a statute (2 Henry V.), reciting that the servants and laborers of the shires of the realm flee from county to county because they would not conform to the law, and because the law was not put in force in every county, the former acts were confirmed and directed to be put in force and proclaimed by the sheriff. Justices of the peace were empowered to send writs to the sheriffs for fugitive laborers in like manner as the justices have power to send to every sheriff for his felons or thieves before they are indicted, and to examine all kinds of laborers, servants, and their masters as well as artificers, and to punish them upon confession in accordance with the statutes.

Early in the following reign (2 Henry VI., 1423), further power was given to justices to compel by process an appearance before them of masters as well as servants for examination as to the execution of the statute of Henry V., and to give offenders a month's imprisonment. Four years later (1427) the conclusion was drawn that the statutes of Richard II., were faulty—that of 12 Richard II., because it was too hard on the masters, that of 13 Richard II., because no penalty was attached to its breach; and, besides remedying the defects, it was enacted that justices should fix and make proclamation of wages. Two years earlier (1425), legislation had been directed against meetings of masons. The statute 3 Henry VI. c. 1 recites that "by the annual congregations and confederacies made by masons in their general chapters assembled, the good courses and effect of the Statutes of Laborers are publicly violated and broken, in subversions of the law, and grievous damage of all the commonality;" and such chapters and congregations were forbidden. It was made felony to cause them to be assembled and held, and masons attending them were to be punished by imprisonment and fine. In 1444 a scale of wages in agriculture and trade was fixed (including freemasons and "rough" masons, master carpenters and mesne carpenters, and master tilers and slaters), and a servant in husbandry was required before departing to give half a year's warning or else to serve his master the year following. Persons refusing to serve or labor were to be committed to jail, there to remain until they found sufficient surety to serve, and masters were entitled to a fixed fine on such.

A statute toward the close of the fifteenth century (1495, 11 Henry VII.) referring to previous statutes, especially to the 23 Henry VI. and complaining of their inadequacy and imperfect execution, proceeds to fix the wages of artificers and laborers with great minuteness. This act contained a remarkable clause against unlawful conspiracy by workmen engaged in building; if such artificers or laborers "make or cause to be made any assembly to assault, harm, or hurt any person assigned to control and oversee them in their working, that he or they so offending have imprisonment for a year without letting to bail or mainprise, and further to make fine at the king's will." It is not surprising that even with so very limited knowledge of principles a short time sufficed to show how ineffectual minute legislation was to control wages. The statute was repealed in the following year, "for divers and many reasonable considerations and causes, the king's highness moving, and for the common wealth of the poor artificers, as freemasons, carpenters, and other persons necessary and convenient for the reparations and buildings, and other laborers and servants of husbandry." But what is surprising is that (although the first legislation of the sixteenth century was in favor of masters) we find in 1514 a statute regulating wages and hours of work and even the summer day sleep of artificers and laborers, and in fact a re-enactment of the law of 1495. The London workmen could not endure this restriction as to wages, and in the following year were allowed to take the previous rate when working within the city or its liberties; the king's works were, however, excepted.

At this point it is necessary to refer to the provisions made against vagrancy in the sixteenth century, these being closely connected with compulsory labor. The great social revolution caused by the suppression of the monasteries, and by the consequent withdrawal of the support which those institutions afforded to the indigent, and too often to the idle, had led to the dispersion over the face of the country of a multitude of beggars, many of whom were able to work but preferred idleness, often adding theft and robbery to mendicancy. Under these circumstances harsh and cruel statutes were passed in the reigns of Henry VIII., Edward VI., and Elizabeth.

In 1530 (22 Henry VIII.) any person, being whole and mighty in body and able to labor, found begging or being vagrant, and giving no satisfactory account how he lawfully obtained his living, might be arrested by a constable, and a justice might, in his discretion, cause every such idle person to be taken to the nearest town and there tied to the end of a cart naked, and to be beaten with whips throughout the town "till his body be bloody by reason of such whipping." He was then required to take an oath to return to his home "and put himself to labor as a true man ought to do." The whipping was to be repeated as often as he made default; but five years later the punishment for "rufflers, sturdy vagabonds, and valiant beggars" persisting in not working after a whipping was increased to having the upper part of the gristle of his right ear clean cut off. If still persistent he was to be tried, and executed as a felon.

On the accession of Edward VI. a law was passed by which a serving man wanting a master, or loitering or wandering, and not applying himself to honest labor, might on conviction be marked with the letter V, and adjudged to be the slave for two years of the person buying him, giving him only bread and water or small drink, and such refuse of meat as the master should think fit, and causing him to work by beating, chaining, or otherwise. If he ran away he might not only be punished by his master in the same way, but the justices on conviction, were to have him marked on the forehead or ball of the cheek with a hot iron with the letter S, and adjudge him to be the master's slave for life. If he again ran away the offense became felony, and he was to suffer the pains of death "as other felons ought to do." Any child of a vagabond, above the age of five and under fourteen, might be adjudged the servant or apprentice of any person willing to take it until the age of twenty-four if a male and twenty if a female; if it ran away slavery followed for life. The master might put a ring of iron about the neck, arm, or leg of his slave to prevent his running away, with a penalty on any person helping him to take it off, and if the slave resisted correction he was to be executed as a felon. The slave might be sold or devised by will as other goods and chattels. This statute was repealed three years after, but it remains on the rolls of parliament, and nothing can obliterate the fact and the consequent disgrace attaching for all time to the parliament that could pass such a law, and to the country that could endure it for a day. This reintroduction of slavery in England by name, and in its worst form, is memorable, and serves to mark the alteration of opinion and feeling that has since taken place, much more than any contrast between freedom of labor and wages in the sense of the political economist.

Early in the reign of Elizabeth the statute commonly called "the Statute of Laborers," repealed all former statutes relating to laborers in husbandry and artificers or laborers engaged in particular trades, and consolidated and amended many former provisions. Its chief object was to provide a new rate of wages, and, in addition, to regulate in many respects the terms of employment as between the employer and the employed. This act admits that the wages laid down by former statutes are in divers places too small in view of the general rise of prices, but approves of the principle and aims of previous legislation, the substance of which it seeks to digest into a single statute. The statute draws a main distinction between artificers and laborers in husbandry. The former may not be hired for a less term than a year, and any unemployed person brought up in a craft or who had practiced it for more than three years was bound, on pain of imprisonment, to accept service if required "by any person using the art or mystery wherein he has been exercised," unless he had a farm in tillage, an estate worth 40s. a year, or goods to the yearly value of £10. Similar provision was made in respect of service in husbandry. Every person between the ages of twelve and sixty was in like manner bound to serve in husbandry unless possessed of property of specified amount, or employed as a fisherman or mariner, or in mining, or in any of the arts or sciences previously mentioned, or unless born a gentlemen, or unless a member of a university or school. Minute regulations were made with reference to the rights and obligations both of master and servant. No person retained in husbandry or trade was to go out of the county or shire where he last served, to serve in any other, without a testimonial. No person leaving his service could be taken into another without showing such testimonial to the authorities of the place in which he was about to serve. If he broke this regulation he was to be imprisoned till he could procure a testimonial, and unless he did so within twenty-one days he was to be whipped. Every person retaining a servant without the latter showing such testimonial forfeited £5. Besides empowering justices in session to make a rate of wages, the statute fixed with great minuteness the hours of labor. In the time of harvest, justices or constables, or other head officers might require artificers and persons who meet for labor to serve by the day in mowing, reaping, shearing, getting, or turning of corn, grain or hay, according to the skill and quality of the person, and upon refusal might put him in the stocks for two days and a night. Even single women between the ages of 12 and 40 might be compelled to serve in such employment as the justices might direct, under pain of imprisonment. Amended provision was made toward the close of the reign for justices yearly fixing the rate of wages.

In Scotland we find complaints in the sixteenth century by masters of salt-pans of the great rise in wages, and early in the seventeenth century (1617) justices were directed to fix at quarter sessions the ordinary rate of hire and wages of workmen, laborers and servants, and to imprison those who refused to serve for the appointed hire. At the same time, "that servants may be the more willing to obey the ordinance," power was given to the justices to compel payment of wages. This law was re-enacted in 1661. Some years previously (1606), anyone hiring a collier or salter without a sufficient testimonial from his last master was compelled to deliver him up if demanded; and colliers and salters were empowered to apprehend vagabonds and sturdy beggars and force them to labor. In 1621, in consequence of "the great straits and necessities that the poor laborers of the ground" were driven to by the "fraud and malice" of servants who either refused to be hired without the promise of great wages, or else hired themselves from Martinmas to Whitsunday, then "casting them loose" on purpose to make their gain and advantage by extraordinary works, such as casting and winning peats or turfs, building fold dykes, and shearing in the harvest, hired servants were forbidden to leave unless upon proof to a justice of the peace that they were hired to another. If it was found that a servant was not so hired, his master was empowered to detain him at the previous rate of wages. Power was given to apprehend a servant "who broke loose," and to deliver him to a constable or justice, and a power to all persons to apprehend loose and masterless men and women found within their own bounds; and the justices and constables were empowed to compel them to serve for competent hire and wages. Twenty years later servants in manufactories were compelled to work at reasonable rates, and not to hire without their previous master's consent. Houses of correction were erected for disobedient servants, and in 1672 masters of correction houses were empowered to receive such servants and to force them to work, and to correct them according to their demerits. These later laws of Scotland were accompained by others directed against vagrancy.

Directly to the subject of this article, and arriving at the middle of the eighteenth century, we find the legislature no longer employed in compelling laborers or artisans to enter into involuntary service, but regulating the summary jurisdiction of justices in the matter of disputes between employers and employed, in relation to contracts and agreements, express or implied, presumed to have been entered into voluntarily on both sides.

The statute 20 Geo. II. c. 19 (passed in 1746) provided that all complaints, differences, and disputes arising between masters and servants in husbandry hired for one year or longer (extended by a subsequent statute of the same reign to those hired for less than a year), or arising between masters and artificers, handicraftsmen and miners (applied in 1829 to laborers of every sort), were to be determined by one or more justices, who, upon complaint of the servant, might determine any dispute as to wages and order payment of any sum found to be due, not exceeding £10 in case of a servant in husbandry, and £5 in case of artificers and other laborers, and, in the event of non-payment, might levy the same by distress on the goods of the master. In case of complaint by the master, the authority of the justice was still larger. He had power to entertain a complaint of "any misdemeanor, miscarriage, or ill-behavior of the servant in his or her service or employment," and to hear, examine and determine the same. If the decision was adverse to the servant, the justice might either abate some part of the wages due to such servant, or discharge him from the service, or he might punish the offender by committing him to the house of correction, "there to be corrected," which term was held to mean correction by whipping and holding to hard labor for a reasonable time, not exceeding a month.

A statute of 1823, the next general statute on this subject, took a somewhat wider scope, dealing with breaches of contract on the part of the servant in not entering into the agreed service at all, as well as in quitting it before the term agreed on had expired, and subjecting these breaches as well as any misdemeanor or misconduct while in the service to the jurisdiction of the justice, who might adjudge the offender to be imprisoned in the house of correction for a term not exceeding three months (but without any power to order corporal punishment), abating a proportional part of his wages in the future, or adjudging him to lose the whole or part of his wages already earned; or, he might dismiss him from the service.

Thus stood the statute law until 1867. In consequence of considerable dissatisfaction on the part of workmen with the adjudication of justices, a select committee of the House of Commons was appointed in the previous year to inquire into the state of the law as regards contracts of service between master and servant, and as to the expediency of amending it.

The Master and Servant Act, 1867, sometimes called Lord Elcho's Act, was framed upon the report of the committee, and embodied most of the recommendations. As regards simple breaches of contract, the position of servants was considerably improved. Imprisonment, which, under the former acts, the magistrate was authorized to impose in the first instance as a punishment for a breach of the contract, was taken away, except as auxiliary to the jurisdiction, as the consequence of disobedience to the order of the court; and whenever imprisonment might, under the former acts, have been accompanied by hard labor, the power to order hard labor was taken away. Lord Elcho's Act did not, however, remove the dissatisfaction felt on the part of workmen, and the events of a few years rendered it desirable to reconsider the whole law, with reference not only to breaches of contract but to other special legislation of a criminal kind, and to the general law of conspiracy affecting the relation of employer and employed.

Commissioners reported in 1875 recommending, so far as relates to the scope of this article, that the proceedings should be altogether divested of a penal character and assume that of a civil proceeding for specific performance or recovery of damages, and that, to effect the main object, Lord Elcho's Act should be amended or a new act framed in clearer language. Within a few months of the presentation of the report, Mr. Cross, then secretary of state, introduced two bills, the one an "Employers and Workmen Bill," and the other a "Conspiracy and Protection of Property Bill," and these bills, after undergoing considerable discussion and alteration in their different stages, were passed, and came into operation on September 1, 1875. This article only deals with the former act. While carrying out there commendation of the commissioners regarding Lord Elcho's Act, and placing all provisions of a penal character in a separate act ("Conspiracy and Protection of Property"), the legislature thought fit to go further and take away the right of enforcing performance of contracts of labor (although that is a very important branch of civil procedure in relation to various matters of contract), and make it a mere question of recovery of damages, unless both parties agree that security for performance of the contract shall be given instead of damages. Adjudication can be by courts of summary jurisdiction.

Neither this act nor its predecessor takes away the right of parties to sue in the ordinary civil tribunals of the country; but the act puts county courts (in Scotland the ordinary sheriff court of the county, in Ireland the civil bill court) practically on the same footing with courts of summary jurisdiction—the jurisdiction of magistrates being simply because the county courts in most places do not sit sufficiently often for the practical adjudication of these differences. The title of the act, "to enlarge the powers of county courts in respect of disputes between employers and workmen, and to give other courts a limited civil jurisdiction in respect of such disputes," indicates its general scope, which is borne out by its provisions. It extends to "any dispute between an employer and a workman arising out of or incidental to their relation as such." The expression "workman" does not include a domestic or menial servant, but means any person who, being a laborer, servant in husbandry, journeyman, artificer, handicraftsman, miner, or otherwise engaged in manual labor, whether under the age of twenty-one years or above that age, has entered into or works under a contract with an employer, whether the contract be made before or after the passing of the act, be express or implied, oral or in writing, and be a contract of service or a contract personally to execute any work or labor. Payment of damages and debts under the act, as in other cases of judgment debts, is enforceable by imprisonment for a term not exceeding six weeks, only on proof of ability and neglect to pay, whether the proceedings be in the county court or in the court of summary jurisdiction.

Two circumstances show the rapid strides made in a few years in the position of labor in relation to legislation. Lord Elcho's Act in 1867 received the title of "The Master and Servant Act." In eight years that title is silently dropped, and "Employers and Workmen" substituted. In 1867 the prime minister spoke in high terms of eulogy of Lord Elcho's Act as securing valuable rights for workmen. In 1875 the same prime minister, speaking a few weeks after the passing of the act of that year, remarked that for the first time in the history of the country the employer and employed sat under equal laws.

Although the general tendency of colonial legislation is to follow that of the parent country, where it can be applied, that is not the case in some important British colonies in relation to the enforcement of labor contracts.

In New South Wales, servants, including artificers, journeymen, and handicraftsmen, and all agricultural laborers, as well as domestic servants, are dealt with under a colonial act of 1857. For not fulfilling a contract, whether by deserting or not entering upon the service, or for other misconduct or ill-behavior, justices upon conviction may impose a fine not exceeding £10. In default of distress, imprisonment, not exceeding fourteen days, or forfeiture of wages then due may follow. Obtaining advances of money after entering into a contract and refusing to go to the place of service, or refusing to perform work to the extent of the advance without reasonable cause, is punishable by direct imprisonment with or without hard labor for any term not exceeding three months. Persons knowingly concealing or employing absconding or absenting servants or persuading them to violate agreements are liable to a penalty not exceeding £10, and in default imprisonment for fourteen days. On the other hand wages not exceeding £50 and full costs may be recovered by distress, and in default imprisonment for fourteen days; masters are also liable to a penalty for withholding property of their servants. Independently of these provisions, justices may hear and determine in a summary manner any complaint, difference, or dispute between a servant and his master, and the award may be enforced by canceling an agreement or imposing a fine, and in default of distress by imprisonment not exceeding fourteen days. The penalty of imprisonment under the act does not extend to women.

In South Australia, by an act of 1878 (following in the main the tenor of Lord Elcho's Act, rather than the legislation of 1875), whenever the employer or employed neglects or refuses to fulfill any contract, or the employed neglects or refuses to enter or continue his service or absents himself, or whenever any dispute arises between the parties, the case may be summarily decided by justices, who may order an abatement of wages due, or direct the fulfillment of the contract, with a direction to the party complained against to find security by recognizance or bond with or without sureties; or the contract may be annulled and the amount of wages or compensation apportioned; or, where pecuniary compensation will not, in the opinion of the justices, meet the circumstances of the case, they may impose a fine not exceeding £20.

The condition of the law in European states at the present time with regard to the enforcement of labor contracts is this: In France contracts of work and service stand on the same footing as other contracts. The breach of such contracts is regarded as a private matter, as the subject of a claim for damages, but not of the application of the criminal law. The recovery of damages is regulated by the Code Napoleon. The *juge de paix* decides the amount when the sum claimed is under 200 francs, when above that amount the tribunal of first instance. So in Belgium there is no criminal penalty attaching to the breach of a contract of labor; such a contract entitles the aggrieved party, as a general rule, only to pecuniary damages; and the same is the case in the Netherlands, Austria Hungary, Italy, Portugal, Sweden, Norway, and Russia. In Switzerland there is no criminal liability, provided the dereliction of duty involves no consequences injurious to the public welfare or to the life or health of other persons. The performance of contracts, however, in the larger works in Switzerland is secured by the system of "decompte," or portion of wages retained as security by the employer In Prussia, although in 1869 all the penal regulations previously existing against breaches of contract and wrongful cessation of work on the part of workmen in mills, mines, and metallurgical establishments, and in underground quarries and pits, were repealed, police laws are, it seems, still capable of being enforced by way of fine, and, in default, by a short imprisonment in some provinces, against agricultural laborers, and against boatmen or workmen engaged in special field or forest work.

Of the United States, the English representative wrote thus to the Foreign Office in 1869: "There are few countries in which the workingman is held in such regard as in the United States of America. The laboring classes may be said to embrace the entire American nation. Every man works for a living, follows a profession, or is engaged either in mercantile or industrial pursuits." As might be expected, it may be said that, as to both parties to a contract for labor and service, they stand upon the mere footing of contract, and such contract is not distinguished from any other contract. The matter does not belong to the province of federal legislation, but to the regulation of each particular State. There has been no legislation, however, making the breach of a contract for labor or services the subject of criminal liability. Contracts of apprenticeship are, nevertheless, enforced by statutory provisions.

Legislation on the subject of labor in the United States has been extremely meager, the laws that have been passed in the States generally dealing with incidents of labor rather than attempting to regulate the relation of master and servant. The principal point on which enactments have been passed are those prohibiting the employment of child-labor, and enjoining proper sanitary and protective measures for the health and safety of employes—somewhat analogous to the English employers' liability acts. In truth the report of the English representative given in 1869 is about as applicable in 1890 as then.

Numerous attempts have been made to secure both national and State legislation on the subject of labor, but the results of these efforts are as yet *in futuri.* Fifteen States and the General Government have established bureaus of labor statistics; but these may be classed more properly under the head of results of agitation by skilled labor, and will be treated of under the head TRADES UNIONS.

The following account of existing conditions in England may be said to be in general true of the United States, although the modes of enforcing contract between employer and employe differ in each State of the Union. Yet the general trend of legislation is to the improvement of the status of labor.

With reference to the period of service, there is no law directly limiting it. A right even to perpetual service founded on a contract may not perhaps be illegal and void; for, if a man can contract to serve for one year, there seems to be no reason to prevent his contracting to serve for 100 years if he should so long live—though the courts would be inclined to consider it an improvident engagement and would not be very strict in enforcing it. No such perpetual contracts, however, exist in actual practice, and where no time is expressly stipulated or implied the contract is generally construed to endure until determined by a reasonable notice on either side, to be construed by the general usage in relation to the particular employment. If a time is expressed or implied, the silent continuing in the service after its expiration draws with it in general a renewal of the same terms as were originally stipulated for. In agriculture the general engagement, express or implied, is for a year. In manufacture it is seldom so long, and in journeyman handicrafts it is sometimes by the hour, but the usage to calculate earnings and the time of payment by the hour or day is often, of course, quite distinct from the duration of the contract. Payment by measure or quantity (piecework) is very general, and so far as the calculation of earnings is concerned supersedes reference to time. Nevertheless the obligation to serve may be conditional on the employer finding a reasonable quantity of work, or may expressly or implicitly endure until a reasonable notice is given on either side. In the pottery manufacture in North Staffordshire most of the workmen in the different branches of the trade are paid by the quantity according to a price-list, the engagement being, by usage, from Martinmas to Martinmas; and in this and in most other manufactures where the artisan works on the material and in the manufactory or the workshop of the employer he is subject to the usual hours of work, although only paid by the quantity.

Most workmen of all classes and descriptions of labor are paid weekly, in whatever way their earnings accrue or are calculated. The contracts of infants (see INFANT) for their personal services as necessary for their maintenance are enforceable, for unless they could make such contracts they might starve. As long as these contracts were enforceable by imprisonment the courts looked closely into them, refusing to enforce them unless they were mutual, that is, capable of being enforced against the employer as well as against the servant. If there were an agreement to serve under circumstances which involve no obligation to employ, the courts would not enforce the contract, and young servants were not infrequently discharged from custody on the ground that no obligation to serve existed by reason of the one-sidedness. Contracts of APPRENTICESHIP (*q. v.*) are beyond the limits of this article.

A recent important Act of Parliament, the Employers' Liability Act, 1880, must be noticed. To render its provisions intelligible, it is necessary to state the general law on the subject of civil liability for negligence. A person who causes injury to the person or property of another is liable in damages to that person, and if the injury has resulted in death the right of action is extended to the representatives, on behalf of the widow or children, independently of any criminal liability incurred by the negligence. If the person who committed the negligent act is in the service of another, and the negligent act was committed in the course of the discharge of his duty, the civil liability extends to the master. This liability of the master is important to the injured person, because the servant is in most cases a much poorer person then the master. If they were equally able to pay damages, nothing would be gained by resorting to the master. But the liability of the latter was not, before 1880, extended to make the master responsible in damages if the person injured and the negligent servant were both in his service and both were performing the same kind of duty, a "common employment" as it has been termed, and if the master, so far from being guilty of any actual negligence himself, had employed a generally competent person, and had provided him with the means of properly performing his duty. No vindication of the then law seems necessary, for, whether the liability of an employer to strangers is just or not, there is an obvious distinction between such a liability and responsibility where all parties are "rowing in the same boat," to adopt an expression used in one case, whether the injured person be a servant or guest of the master. Both are volunteers, and both know that the master will not personally intervene. There does not appear to be any injustice in such a case in confining the liability to that of the servant personally guilty of the negligence, although a poor man. However, some apparently hard cases, especially arising out of accidents on railways, where, while a passenger could sue the company for negligence, an engine-driver or a guard's remedy was limited to the person actually guilty of the negligence, led to the attention of Parliament being called to the subject.

By section 1, where personal injury is caused to a workman: — "(1) By reason of any defect in the condition of the ways, works, machinery, or plant connected with or used in the business of the employer; or (2) by reason of the negligence of any person in the service of the employer, who has any superintendence intrusted to him, while in the exercise of such superintendence; or (3) by reason of the negligence of any person in the service of the employer to whose orders or directions the workman at the time of the injury was bound to conform and did conform, where such injury resulted from his having so conformed; or (4) by reason of the act or omission of any person in the service of the employer done or made in obedience to the rules or by-laws of the employer, or in obedience to particular instructions given by any person delegated with the authority of the employer in that behalf; or (5) by reason of the negligence of any person in the service of the employer who has the charge or control of any signal, points, locomotive engine, or train upon a railway—the workman, or in case the injury results in death the legal personal representative of the workman, and any person entitled in case of death, shall have the same right of compensation and remedies against the employer as if the workman had not been a workman of nor in the service of the employer, nor engaged in his work."

Section 2 provides that a workman shall not be entitled under the Act to any right of compensation or remedy against the employer in any of the following cases: —

(1) Under subsection 1 of section 1, unless the defect therein mentioned arose from, or had not been discovered or remedied, owing to the negligence of the employer, or of some person in the service of the employer, and intrusted by him with the duty of seeing that the ways, works, machinery, or plant were in proper condition; (2) under subsection 4 of section 1, unless the injury resulted from some impropriety or defects in the rules, by-laws, or instructions therein mentioned; provided that, when a rule or by-law has been approved or has been accepted as a proper rule or by-law by one of her Majesty's principal secretaries of state, or by the Board of Trade, or any other department of the government, under or by virtue of any Act of Parliament, it shall not be deemed for the purposes of this Act to be an improper or defective rule or by-law; (3) in any case where the workman knew of the defect or negligence which caused his injury and failed within a reasonable time to give, or cause to be given, information thereof to the employer or some person superior to himself in the service of the employer, unless he was aware that the employer or such superior knew of the said defect or negligence."

Compensation under this Act (which extends to a railway servant and any person to whom the Employers and Workmen Act, 1875, already noticed, applies) is enforced by action in the county court (in Scotland the sheriff's court, in Ireland the civil bill court) after notice within six weeks of the nature and particulars of the claim (unless there was reasonable excuse for the want of notice in the case of death). The compensation is limited to three years' earnings, and the action must be commenced within six months from the occurrence of the accident, or in case of death within twelve months from the time of death.

Neither in the United Kingdom nor abroad does the right to damages for breach of contracts override the general law as to offenses, so that, if any of the parties do anything amounting to a criminal offense, a prosecution may follow although a breach of contract is involved for which breach damages may be recovered. There are moreover a variety of Acts of Parliament from the reign of Anne still in force for securing employers from frauds of workmen employed in various trades in working up materials, not only as regards the misappropriation of property intrusted to them, but also in relation to fraudulent contrivances for misrepresenting the amount of work done. For such offenses fine or imprisonment may be inflicted.

Apart from the legislation already mentioned, there are a great number of Acts of Parliament directly or indirectly affecting labor. The general direction of all such legislation is to ameliorate the condition of workmen.

The legislation regulating the hours of labor of young persons, originating in the benevolent exertions of the earl of Shaftesbury, and extended by Lord Aberdare as secretary of state for the home department and others, is most important (see FACTORY ACTS). The indirect effects of those provisions in causing better order in the conduct of manufacturing industries cannot be overlooked. The Agricultural Gangs Act, 1867, arising out of the practice in the east of England of persons known as gang masters hiring children, young persons, and women, with a view to contracting with farmers and others for agricultural work is a recent illustration of the direct objects of such legislation. The fencing of machinery, the careful working of coal and metalliferous mines and the like, have been the subject of minute legislative provisions, which, as well as the Explosives Act, 1875, intimately affect the well-being of the laboring community and the general safety.

THE LABOR MOVEMENT AND ITS ORGANIZATIONS.

As a consequence of strikes, lockouts, and the various conflicts between labor and capital, which sometimes threaten to paralyze the commercial interests of cities and states, the labor movement of America is receiving attention from the ablest students of the times. This movement does not differ in any essential particular from the movement in the old world. Labor here, as there, is regarded as a commodity, bought and sold in the open market. The truth is that the economic constitution in America does not differ from that of Europe. Hence it is that the employer seeks to secure labor for the least possible outlay, while the laborer endeavors to obtain as high a compensation as possible. From this antagonistic principle between the buyer and seller of a commodity springs the idea of a combination among the workers for their mutual advancement and protection.

The ship carpenters and caulkers of Boston and New York were the first to organize, and the first authenticated strike in this country occurred in New York city in 1803. (See STRIKES.) In 1806 the ship carpenters and caulkers of New York city asked a reduction of the hours of labor from fourteen to ten. The merchants who employed these men condemned their action as having a direct tendency to put their business into other hands, or to seriously injure it by inducing ship owners to repair their vessels elsewhere, rather than submit to the inconvenience, delays, and vexations to which they would be exposed by a compliance with such demands. The merchants further declared their intention to blacklist all persons belonging to the association which demanded the reduction of the hours of work. Since that date, as manufacturing interests developed, the necessity of organization among workingmen, it was claimed, became more apparent, the chief struggle, however, until the close of the Civil war, being to reduce the hours of labor to ten per day. Before the railroad strikes of 1877 the labor question was of small moment to the average citizen. These strikes did more for the building up of these powerful organizations, claiming public attention, than all other movements combined. Since their occurrence a new literature has appeared, and everywhere people are thinking of the social problem.

AMERICAN FEDERATION OF LABOR.—On August 20, 1866, delegates from sixty labor organizations convened in Baltimore, Md., and founded what was known as the "National Labor Union." That body afterward met annually, at Chicago in 1867 and 1869; at Pittsburgh and New York city in 1868; Boston, 1870; Philadelphia, 1871; and at Columbus, Ohio, in 1872, at which a candidate for the presidency of the United States was placed in nomination. In the light of subsequent history, this action has been regarded as a "fatal mistake." Its effect has been declared to have provoked dissensions, "and caused the rapid disintegration of that once powerful body." The financial convulsions of 1873 are also cited as potent factors in delaying the realization of an effective unity of the working class. At length, after a period of inaction in the domain of industrial organization, one hundred and seven delegates, representing nearly a quarter of a million workers, met in convention at Pittsburgh, Penn., November 15, 1881, and established the "Federation of Organized Trade and Labor Unions of the United States and Canada." The organization thus created is now known as the "American Federation of Labor." The prime object of this organization as set forth in a document read at the second convention held in Cleveland, Ohio, November 22, 1882, is industrial and not political unity—"not by prescribing a stereotyped uniform plan of organization for all, regardless of their experience or necessities, nor by antagonizing, or aiming to destroy, existing organizations, but by preserving all that is integral in them and widening their scope, so that each, without submerging its indviduality, may act with the others in all that concerns them." The address further recommended the inauguration of a systematic plan of propaganda, to secure a check on the transportation of labor from one country in order to cheapen it in another at the behest of capital, and the procuring of an enactment that on a given day eight hours should constitute a day's labor. At the third convention held in New York city, August 21, 1883, the legislative committee was instructed to present a bill to congress providing for a national department of labor, and a committee was appointed to confer with the Knights of Labor with a view to the consolidation of all labor efforts. The fourth convention assembled in Chicago, October 7, 1884, when May 1, 1886, was fixed upon as the date for the inauguration of the eight-hour movement. The fifth convention was held at Washington, December 8, 1885, and was marked by measures which were taken to prevent the abuse of the boycott. On May 4, 1886, occurred the bomb-throwing at the Haymarket meeting in Chicago. This had a depressing effect on the eight-hour movement, but a number of unions succeeded in enforcing their demand. At the sixth convention held in Columbus, Ohio, December 8, 1886, twenty-five affiliated national organizations were represented, with an aggregate membership of 316,469 workmen; a more perfect plan of organization was adopted, and the title changed to the "American Federation of Labor." Conventions have since been held at Baltimore, in December, 1887, and at St. Louis, December 11, 12, 13, 14, and 15, 1888. At the former, 2,421 unions, and a total membership of 600,340, were represented. The proceedings of the latter convention were marked by the adoption of a resolution again fixing the date of the general inauguration of the eight-hour work-day, this time, on May 1, 1890. To this end, it was decided to call simultaneous mass meetings in all cities of the country on Washington's Birthday, February 22, July 4, and Labor Day, 1889, and on Washington's Birthday, 1890. The recommendations of the St. Louis convention were observed, and the first series of eight-hour meetings embraced 140 cities of North America.

The last convention of the American Federation was held in Boston, December 10, 1889. The Federation is composed (1902) of 86 affiliated national unions, 20 state branches, 311 city central unions, and 1,208 local unions. The aggregate membership is 900,000. In the eight-hour campaign of 1890 for the carpenters, the Federation was largely instrumental in securing its success.

TRADES UNIONS.—The following is a complete list of the national and international trades unions of North America:

The International Typographical Union, instituted December 5, 1850, with fourteen locals and 6,000 members; now numbers over 275 local unions and 24,000 beneficiary members, its membership extending over 35,000. The International Trade Association of Hat Finishers of America, organized in Philadelphia, June 5, 1854, with twelve local unions, now numbers fifteen locals with 4,000 members, and has complete control of every hatting center. The National Silk and Fur Hat Finishers' Association was formed in 1854, and now numbers seventeen cities. The Cotton Mill Spinners' Association, located in Fall River, Mass., was instituted October, 1858. The Iron Molders' Union of America was organized June 5, 1859, and now covers over 250 unions and 28,000 members, of whom 20,000 are beneficiaries. The Cigar Makers' International Union of America, founded June 21, 1864, with twenty-one unions and 984 members; now 260 local unions and over 28,000 members, of whom 21,000 are beneficiaries. The Brotherhood of Railway Engineers, instituted August 17, 1863, now has 392 sub-divisions, and over 25,000 members. The Bricklayers' and Masons' International Union of America, established February 1, 1865, with three unions, now embraces over 160. The Order of Railway Conductors, organized at Mendota, Ill., in 1868, now has 8,000 members. The United States Wool Hat Finishers' Association, formed April 7, 1869, now has twelve locals. The German-American Typographia, organized in 1873, with seven locals and 400 members, now has nine locals and 1,400 beneficiary members. The International Union of Furniture Workers of America, instituted July 7, 1873, with nine local unions and 1,156 members, at present numbers twenty-six locals and over 5,000 members. The Brotherhood of Locomotive Firemen, established December 1, 1873, with one local and nine members, now has 380 divisions and 19,000 members. Journeymen Horseshoers' National Union, organized in Philadelphia, April 20, 1874, now has thirty-two local unions and 8,000 members. The National Amalgamated Association of Iron and Steel Workers, founded August 4, 1876, with 111 lodges and 3,755 members, now numbers 177 lodges and 35,000 members, of whom 15,000 are skilled workmen. The Granite Cutters' National Union, established March 10, 1877, now has eighty branches and 5,000 members. The American Flint Glass Workers' Union, organized July 1, 1878, with eleven local bodies, now embraces eighty-three local unions and over 6,000 members. The New England Boot and Shoe Lasters' Protective Union was originated December 27, 1879, with sixteen members; at present it has sixty-six branches and nearly 10,000 members, of whom 7,523 members are beneficiaries. International Brotherhood of Boiler-makers and Iron Shipbuilders and Helpers was formed at Chicago, June, 1880;

now has thirty-three branches and 3,500 members. The Brotherhood of Carpenters and Joiners of America, founded at Chicago, August 12, 1881, with twelve local unions and 2,042 members; now four hundred and eighty-one local unions in four hundred and forty-five cities and 53,000 enrolled members. The Metal Workers' Union of North America, founded in 1882, now consists of twelve local unions, with 1,200 members. The Operative Plasterers' International Union, founded with five locals in 1882, now has twenty local unions and 2,300 members. The National Wood Carvers' Association, founded in January, 1883, now has nine local unions in a thrifty condition.

Since that date there have been organized the Textile Workers' Progressive Union of America, now having eight local unions. The Journeymen Tailors' National Union started at Philadelphia, in August, 1883, with five locals, now has seventy. The Brotherhood of Railroad Brakemen, instituted September 23, 1883, with eight members, now has 260 lodges and 12,000 members. The Journeymen Bakers' National Union, founded in Pittsburgh, January 13, 1885, now numbers seventy-two local unions and 19,000 members. The Waiters' Union, organized in New York city, January 25, 1885, with twenty-two members, at present numbers over 1,200 members. The National Federation of Miners and Mine Laborers, founded September 12, 1885, with about 6,000 members, at this date embraces 25,000 members. The International Boatmen's Union had its origin in February, 1886; now numbers over 1,000 members. The Railroad Switchmen's Association of North America, instituted March 2, 1886, at Chicago, with four local and 1,000 members, has at present fifty-eight locals and nearly 5,000 members. The Tailors' Progressive National Union, established August 22–26, 1886, at Brooklyn, N. Y., with nine unions, now has thirteen unions and 1,500 members. The National Union of the United Brewery Workmen, instituted August 29, 1886, now has fifty-one local unions and 2,500 members. The Brotherhood of Decorators and Painters of America was founded March 15–16, 1887, with thirteen unions, and at present embraces one hundred and sixteen local unions and 5,000 members. The Horse Collar Makers' National Union now has twenty-one local unions and 800 members. The Pattern Makers' National League, instituted at St. Louis, May 18, 1887, has nine unions and 1,000 members. The Paving Cutters' National Union, organized June 1, 1887, at Baltimore, with eleven branches and 500 members, has thirty-six branches and 1,800 members. The Journeymen Barbers' National Union came into existence September 5, 1887, has eight locals and over 2,500 members. The Building Laborers' National Union, started in Worcester, Mass., September 30, 1887, has thirty locals and over 8,000 members. The Journeymen Stone Cutters' Association of North America, organized March 1, 1888. The Oystermen's National Union, now in process of formation, will include eleven unions with 800 members, and the Silkworkers' is a prosperous union.

These organizations are sustained by amounts received from initiation dues and other sources of revenue, and support strike benefits, sick, disability, traveling, funeral, and other benefits. From imperfect reports it is learned that of the total amounts distributed by the above unions during the past ten years, $4,290,074 have been paid in support of strikes, and $2,490,000 for other benefits. Of the strikes entered upon for reduced hours of labor or an increase of wages, a large percentage have been successful.

KNIGHTS OF LABOR.—One of the largest and most powerful labor organizations of modern times was founded at Philadelphia, in December, 1869, the Garment Cutters' Assembly being the first local body organized, and Uriah S. Stephens the first master workman elected. For many years the secrecy concerning the name and existence of the Knights of Labor was the only feature that distinguished the Garment Cutters' Assembly from other trades unions. On October 20, 1870, the former adopted a resolution admitting one hundred and twenty persons of other trades or callings, but they had no voice in matters strictly connected with the garment cutters' trade. Whenever these members of other trades, or "sojourners," as they were called, were sufficient in numbers, a new assembly would be founded under the authority of the Knights of Labor. The first district assembly, composed of the local assemblies of Philadelphia, was organized December 25, 1873. This was followed by the organization of district assemblies at Camden, N.J., Pittsburgh, Penn., and in other cities. The first general assembly of the organization was convened at Reading, Penn., January 1, 1878, and was composed of thirty-two delegates. It met the following year in St. Louis, and elected T. V. Powderly, of Scranton, Penn., master workman, vice Uriah S. Stephens, who had resigned. It was at the same session that a resolution was offered providing for the admission of working women to membership under the same conditions as the men. Action, however, was delayed until the meeting at Pittsburgh, September 7, 1880, when the resolution was adopted. Annual conventions were thereafter held at Detroit, New York, Cincinnati, Philadelphia, Hamilton, Ontario, etc., in the order named, the number of members reported to the Hamilton meeting being 104,335. At the convention which met in Richmond, Va., the year following, the membership was reported as having increased to 702,924. The proceedings of the ensuing general assemblies were of considerable interest. At Minneapolis, October 14, 1887, the friends of the Chicago Anarchists asked the order to exert its influence for clemency. Master Workman Powderly, however, ruled the matter out of order, and his ruling was sustained. The delegates in attendance represented 500,000 members, to which number the order had decreased since the meeting at Richmond. At the last annual convention which assembled in Atlanta, Ga., November 12, 1889, this number had been further reduced to 207,000, which is said to now be very nearly its actual strength. See, also, LABOR, KNIGHTS OF, vol. vi., page 3753, *et seq.*

NATIONALISM in America had its origin in *Looking Backward*, a story written by Edward Bellamy. The influence it has had on the people has been remarkable. Nationalist clubs are being organized throughout the country to carry forward and realize the dream of a happy society, without poverty, as conceived by Mr. Bellamy in his book. Nationalism does not differ from State Socialism; both advocate the collective (governmental) control of industry and education; both charge that the principle of competition is responsible for the glaring inequalities of the present, and seek to substitute national coöperation for private enterprise, in which the State becomes the sole employer of all the activities of its citizens, intellectual and material. Its leading representatives are Edward Bellamy, Laurence Grönlund, Thaddeus B. Wakeman, and Rabbi Schindler.

ANARCHY is that system of voluntary socialism—sometimes called individualism or mutualism—whose battle-cry is "Down with the State." Its earliest exponent in America was Josiah Warren. He was an associate of Robert Dale Owen, at New Harmony, Ind., where in 1825 a Communistic society started under the most favorable auspices. But it was not until the failure of his experiment that Mr. Warren worked out his new principle of "cost the limit of price." Mr. Warren maintains that labor expended forms the only equitable element in the cost of an article, and insists that all natural elements, such as land, should be free to all, and that interest on money could be abolished by issuing labor notes based on labor performed. His ideas are treated by Stephen Pearl Andrews in his work *Science of Society*. Proudhon, the French economist, arrived at the same conclusions about the same time; the only difference between Warren and Proudhon is in the application of some of the details. Anarchists are divided into two schools, namely, the Communist and Philosophic Anarchists. The former lays down the principle "to each according to his needs;" the latter "to each according to his deeds." Thus it will be seen that the philosophic anarchist believes in reward in proportion to merit, hence regards the institution of private property, maintained in the absence of force or fraud, as an essential condition of *Individual Sovereignty* and social progress. Johann Most, editor of *Die Freiheit* (German), represents the Communistic element, while Ben R. Tucker, of Boston, editor and publisher of *Liberty*, is perhaps the most zealous exponent of the philosophical school. Victor Yarrows, John F. Kelly, Miss Dr. Gertrude B. Kelley, J. Wm. Lloyd and Hugh O. Pentecost are representatives of the same school. Their economic demands consist of free land, free banking (through mutual organizations of credit) and free trade. The general assumption in the public mind that *all* anarchists are in favor of applying physical force in furtherance of their ideas, is entirely erroneous.

THE SINGLE TAX is the term which, by common consent, has been adopted to designate the propaganda represented by the teachings of Mr. Henry George. Mr. George was born September 2, 1839, at Philadelphia, Penn. In early life he went to sea, and in 1858 he reached California. He adopted journalism as a profession, and for many years was connected with the press of San Francisco. In 1879 he published his work, *Progress and Poverty*, and in 1880 removed to New York, where he has since resided. *Progress and Poverty* changed many accepted theories of political economy, and rallied around its author an enthusiastic, active, and zealous body of adherents, who have come to be known as single taxers, because they seek to abolish all taxes upon the products of human labor, and take under the forms of taxation the annual values of the land. They would take the annual rentals, considered apart from the improvements which may be upon the land. The effect would be to destroy the selling value of land, because, if its entire income was taken nothing would be left for the landlord. He would pay over to the State all he received from the tenant, and no matter how high the rent might rise he could retain no part of it. But those holding unproductive, that is, vacant land would be called upon to pay just as much as though it were productive, so that the weight of the burden would compel them to improve, or else abandon the land to others. The incentive to build or improve would thus be great, because the tax must be paid in any case, and would not be increased as a result of the improvement. The advocates of the single tax expect its adoption will result in destroying land speculation, opening up to improvement land held out of use for speculative purposes, giving increased employment and higher wages to labor, increasing all kinds of business by increasing the power of poor people to purchase goods, and in lessening the cost of doing business by stimulating the building of stores, warehouses, shops, etc., and thus reducing rents, as well as removing almost the entire burden of taxation. *The Standard*, edited by Mr. George, is the official organ of the movement, and L. F. Post and Thomas G. Shearman are among its regular contributors. The so-called Anti-Poverty Society arose from this idea, its first president, Rev. Dr. E. McGlynn, claiming: "We want to do what churches and creeds cannot do—abolish poverty altogether; to secure to each son of God as he comes into the world a full share of God's natural bounties, an equal right in all the advantages and fruits of civilization and progress, a fair chance to develop all his powers."

LABRADOR, in the widest acceptation of the word, is the peninsular portion of North America bounded on three sides by the Gulf of St. Lawrence, the North Atlantic, Hudson's Straits, and Hudson's Bay, and vaguely defined toward the southwest by Rupert's river, the Mistassini river, and the Bersiamits river. It extends from about 49° to 63° N. latitude, and from the 55th to the 79th meridian. Its greatest length from the Straits of Belle Isle, which separate it from Newfoundland, to Cape Wolstenholme, its most northern extremity, is 1,100 miles; its greatest breadth is about 700 miles. The area is approximately 420,000 square miles, equal to the united areas of the British Isles, France, and Prussia. As a permanent abode of civilized man, Labrador is on the whole one of the most uninviting regions on the face of the earth. The Atlantic coast is the edge of a vast solitude of rocky hills, split and blasted by frosts and beaten by the waves. A vast table-land, in one region 2,240 feet above the sea-level, occupies much of the interior. This plateau is preëminently sterile, and, where the country is not burned, caribou moss covers the rocks, with stunted spruce, birch, and aspen in the hollows and deep ravines. The whole of the table-land is strewed with an infinite number of bowlders, sometimes three and four deep; these singular erratics are perched on the summit of every mountain and hill, often on the edges of cliffs, and they vary in size from one foot to twenty feet in diameter.

The interior of Labrador has been but very partially explored, and even the course of the main rivers is largely matter of conjecture. The largest is probably the Ashwanipi or Hamilton river, which rises in the rear of the Seven Islands, drains a portion of the vast table-land, and falls into Hamilton Inlet, on the Atlantic coast. At its mouth it is nearly a mile and a half in width. One hundred miles from its mouth are the great falls and rapids which extend over twenty miles and involve fifteen portages. The valley of this river is well wooded, some of the trees, which are chiefly spruce, white birch, and poplar, being of considerable size, and tracks of loamy soil being found at intervals along its banks. The Kenamou and the Nasquapee or Northwest river also fall into Hamilton Inlet. The Eagle river, the West and East rivers, all famous for salmon and trout, discharge their waters into Sandwich Bay. Of the rivers falling into Ungava Bay the largest is Koksoak or South river, which is three miles wide at its mouth, and has its source in Lake Kaniapuscaw, seventy miles long and twenty broad, which occupies the very center of the peninsula, being equidistant from the St. Lawrence, Ungava, and Hamilton Inlet, and 350 miles from each. George's river and Whale river also fall into Ungava Bay. In a few sheltered spots, however, on the margins of the rivers, timber of fair size is to be found. The rivers discharging into Hudson's Bay are Rupert's river, East Main, and Great and

Little Whale rivers. The Moisie river, 250 miles in length, the Mingan, and the Ounaneme fall into the Gulf of St. Lawrence. The St. Augustine falls into a fine bay of the same name, and has its source in the lakes and marshes of the table-land. The country through which these rivers flow is rugged and mountainous, swamps and innumerable lakes occupying the lower grounds.

By far the most important portion of Labrador is the Atlantic seaboard. The coast itself is rugged, but is deeply indented with bays and inlets, and has many fine harbors. The scenery is grand and impressive. Battle Harbor, at the northern extremity of the straits of Belle Isle, is a busy fishing settlement with a narrow sheltered roadstead about half a mile in length between Battle Islands and Great Caribou Island. The water is of great depth in this neighborhood, and is noted for its wonderful ground swell, which at times rolls in without wind from the eastward into St. Lewis Sound. By far the greatest of the numerous inlets which indent the coast is Eskimo Bay or Ivuktoke or Hamilton Inlet, 250 miles north of the straits of Belle Isle. This inlet is thirty miles wide at the entrance, but at Port Rigolette, fifty miles from the sea, it narrows to a mile. On both sides of these narrows hills tower to the height of 1,000 feet, wooded with spruce from base to summit. At the termination of this gorge the inlet again expands and forms Lake Melville, thirty miles in length and twenty in breadth. After narrowing again it forms another lake (Goose Bay) seven miles wide and twenty long, and at its extremity the head of the great inlet is reached, 150 miles from the sea. The scenery along the shores of Hamilton Inlet is wild and rugged, and above Rigolette becomes very grand. Along the south shore of Melville lake are the volcanic peaks of the Mealy Mountains, 1,500 feet in height. This range commences 100 miles to the south of Hamilton Inlet, running nearly parallel to the coast; and after skirting Lake Melville it strikes westerly and is lost in the hilly regions of the interior.

Northern Labrador, from Cape Webeck to Cape Chudleigh, is the proper home of the Eskimo of this region, who are now about 1,400 in number. By the labors of the Moravian Brethren, commenced in 1770, nearly the whole of them have been brought under Christian training. The Brethren have four stations. Each station has a church, store, dwelling house for the missionaries, and workshops for the native tradesmen. The missionaries number about twenty.

The white inhabitants of the St. Lawrence coast of Labrador are chiefly of Acadian or Canadian origin, with a few settled fishermen from France. On the Atlantic coast of Labrador many of the white inhabitants are British sailors and their descendants. Salmon and cod fishing are their main occupations, and the products of their industries are exchanged with traders on the spot for such commodities as they require. The winter is passed in trapping fur-bearing animals. There are nine places of worship—four of the Church of England, three of the Church of Rome, and two Wesleyan. During the fishing season, a steamer carrying mails and passengers plies fortnightly on the coast, connecting with the Newfoundland coastal steamer at Battle Harbor.

The Indians inhabiting the interior of Labrador are now greatly reduced in number. The returns of the Hudson's Bay Company show that about 4,000 of these Indians frequent the company's posts throughout the whole of Labrador, and this account probably includes nearly their whole strength. Nineteen-twentieths of them are nominally Roman Catholics.

Though Labrador is detached from Arctic lands, and though much of it lies between the same parallels of latitude as Great Britain, the climate is rigorous in the extreme, owing mainly to the ice-laden Arctic current which washes its shores. Snow lies from September or October till June. In winter the whole coast is blockaded by ice fields drifting from Baffin's Bay and other outlets of the Arctic Ocean, while in summer icebergs, stranded or floating, impart a stern grandeur to the frowning shores. Traveling is performed by sledges drawn by dogs, sometimes at the rate of 100 miles a day, over the frozen snow. The total permanent population of Labrador is about 4,500.

Tourists in search of the picturesque, invalids, sportsmen, and anglers are finding their way, of late years, in increasing numbers to Labrador, during its brief but lovely summer, and in the fishing season, from the end of June to the first or second week of October, the migratory population from Newfoundland, Nova Scotia, Canada, and the United States numbers between 20,000 and 25,000.

The southern portion of the Labrador coast, as far north as Sandwich Bay, has been frequented as a fishing ground for more than a century. Since about 1850, large numbers of fishermen have extended their operations as far north as Cape Harrison or Webeck. From about 1870, Newfoundland cod-fishers have ventured as far north as Cape Mugford.

The principal fisheries are those of cod, herrings, salmon, and seals.

Labrador, as well as Newfoundland, was discovered by John Cabot in 1497; the recent discovery of a map made by or under the direction of Sebastian Cabot proves that it must surrender the honor of being his "Prima tierra vista" to the present island of Cape Breton. Cabot does not appear to have given any name to Labrador; tradition has it that a Basque whaler, called "Labrador," penetrated as far as Labrador Bay (now Bradore Bay), and that, as this bay was in process of time much frequented by Basque fishermen, the name was extended to the whole coast.

LA BRUYÈRE, Jean de, essayist and moralist, was born at Paris in August, 1645. La Bruyère's father held a municipal appointment in the capital, and seems, as well as his son, to have been in easy circumstances. The son was educated by the Oratorians and at the university of Orleans; he was called to the bar, and in 1673 bought a post in the revenue department at Caen, which gave the status of noblesse and a certain income. He afterward, in 1687, sold this office. His predecessor in it was a relation of Bossuet, and it is thought that the transaction was the cause of La Bruyère's introduction to the great orator. Bossuet, who, from the date of his own preceptorship of the dauphin, was a kind of agent-general for tutorships in the royal family, introduced him, in 1683 or 1684, to the household of the great Condé, whose grandson, Henri Jules de Bourbon, he was charged to educate. The rest of his life was passed in the household of the prince or else at court, and he seems to have profited by the inclination which all the Condé family had for the society of men of letters without suffering from the capricious and tyrannical temper which was also one of the characteristics of the house. Very little is known of the events of this part, or, indeed, of any part of his life. His *Caractères* appeared in 1688, and at once, as Malezieu had predicted, brought him much advice and many enemies. His unpopularity was, however, chiefly confined to the subjects of his sarcastic portraiture, and to the hack writers of the time, of whom he was wont to speak with a disdain only surpassed by that of Pope. La Bruyère's discourse of admission at the Academy was, like his admission itself, severely criticized, yet it is certainly one of the best of its kind. With the *Caractères*, the translation of Theophrastus and a few letters, it completes the list of his literary work, with the exception of a curious and much-disputed posthumous treatise. La Bruyère died very suddenly, and not long after his admission to the Academy (1696).

LABUAN, or LABUHAN, an island of the East Indian Archipelago, which has been a British possession since 1846. It lies about six miles off the northwest coast of Borneo, opposite the northern end of the great bay of Brunei. Rudely triangular in shape, it measures about seven miles across the base, and has a length of eleven miles from north to south. Population (1901), 8,411.

LABURNUM is the specific name of a familiar tree of the genus *Cytisus*, Dec., of the pea family or *Leguminosæ*. It is a native of the mountains of France, Switzerland, southern Germany, northern Italy, etc., has long been cultivated as an ornamental tree throughout Europe, and was introduced into northeast America by the European colonists. Several varieties of this well-known tree are cultivated, differing in the size of the flowers, in the form of the foliage, etc., such as the "oak leafed." The laburnum has highly poisonous properties. A case is recorded of nearly fatal results to several boys who masticated the roots on finding they tasted like licorice, which is a member of the same family as the laburnum. It has proved fatal to cattle, though hares and rabbits eat the bark of it with avidity. The seeds also are highly poisonous, possessing emetic as well as narcotico-acrid principles, especially in a green state.

The heart wood of the laburnum is of a dark reddish-brown color, hard and durable, and takes a good polish. Hence it is much prized by turners, and used with other colored woods for inlaying purposes. The laburnum has been called false ebony from this character of its wood.

LABYRINTH. The legendary labyrinth is one of the clearest examples of the close relation between mythology and the early stages of the industrial arts. The word is derived from a Greek word meaning pasages of a mine. The mines of Greece, like those of Thrace and the Ægean Islands, were probably first worked by the Phœnician traders; and the simple-minded natives regarded the strange holes in the ground with wonder and awe. To the natural fear of darkness was added the invariable tendency of the uneducated to regard as supernatural the power conferred by superior knowledge; moreover, the god of the riches of the lower world was also the god of death and the dead. Their fear expressed itself in tales of the extraordinary ramifications of the dark passages and of the danger to which any heedless intruder into them was exposed. The maze of passages was called a labyrinth; the word became a proper name and gained a life and meaning of its own in legend, quite unconnected with its original application. The best-known instance of its mythic character is found in the legends of Crete. It was interwoven with the tales, partly founded on historical events and partly derived from ancient religion, which clustered round the name of Minos. The skillful workman, Dædalus, who sums up all the legendary conceptions of skill in handicraft, made for King Minos a labyrinth, in the center of which the Minotaur was placed. No one who entered this labyrinth could find his way out again; he became the prey of the monster. The seven youths and seven maidens sent regularly by the Athenians as tribute were thus devoured, until Theseus slew the Minotaur, and escaped out of the labyrinth by the help of the clue which Ariadne had given him.

When the name had once acquired this meaning, it was applied to several real buildings, of which the following are the most famous. 1. The Egyptian labyrinth, beside the town of Arsinoe or Crockidilopolis, was in two stories, one of them underground, and contained 3,000 rooms. Strabo thinks it was built as a common place of meeting for the people of the various nomes; Herodotus and Diodorus say that it was the burial place of the twelve kings who ruled Egypt about 700 B.C. 2. The Samian labyrinth was built by Theodorus, one of the Samian school of sculptors, for the tyrant Polycrates. It had 150 columns, and Pliny says that some scanty remains of it existed in his time. 3. The Lemnian labyrinth mentioned by Pliny, seems to be a confusion with the Samian. 4. The Italian labyrinth was a series of chambers in the lower part of the grave of Porsenna at Clusium. Some maintain that this tomb has been found in the mound named Poggio Gajella near Chiusi.

In gardening a labyrinth or maze means an intricate network of pathways inclosed by hedges or plantations, so that those who enter become bewildered in their efforts to find the center or make their exit. It is a remnant of the old geometrical style of gardening, but is yet occasionally introduced into pleasure grounds. There are two methods of forming it. That which is perhaps the more common consists of walks, or alleys as they were formerly called, laid out and kept to an equal width or nearly so by parallel hedges, which should be kept so close and thick that the eye cannot readily penetrate through them. The task is to get to the center, which is often raised, and generally contains a covered seat, a fountain, a statue, or even a small group of trees. After reaching this point the next thing is to return to the entrance, when it is found that egress is as difficult as ingress. To every design of this sort there should be a key, but even those who know the key are apt to be perplexed.

LAC is a compound resinous and tinctorial incrustation formed on the twigs and young branches of various trees by an insect, *Coccus lacca* (*Carteria lacca* of Signoret), which infests them. Lac is a product of the East Indies, coming especially from Bengal, Pegu, Siam and Assam. The insect which yields it is closely allied to the cochineal insect, *Coccus carti*, kermes, *C. ilicis*, and Polish grains, *C. polonicus*, all of which, like the lac insect, yield a red dye color. The term lac is the same as the numeral lakh—a hundred thousand—and is indicative of the countless hosts of insects which make their appearance with every successive generation. Two evolutions of the young of the lac coccus make their appearance annually, one about the beginning of July and the other early in December. As soon as the minute larval insects make their appearance they fasten in myriads on the young shoots, and, inserting their long proboscides into the bark, draw their nutriment from the sap of the plant. The insects begin at once to exude the resinous secretion over their entire bodies, which forms in effect a cocoon, and, the separate exudations coalescing, a continuous hard resinous layer regularly honeycombed with small cavities is deposited over and around the twig. From this living tomb the female insects, which form the great bulk of the whole, never escape. After their impregnation, which takes place on the liberation of the males, about three months from their first appearance, the females develop into a singularly amorphous-like organism consisting in its main features of a large smooth shining crimson-colored sac—the ovary—with a beak stuck into the bark, and a few papillary processes projected above the resinous surface. The red fluid in the ovary is the substance which forms the lac dye of commerce, and, when the young are allowed to hatch out, the greater part of this coloring matter is lost, and only a dead resinous substance remains on the twig. To obtain the largest amount of both resin and dye-stuff therefore it is necessary to gather the twigs with their living inhabitants in or near June and November. Lac incrusting the twigs as gathered is known in commerce as "stick lac;" the resin crushed to small fragments and washed free from coloring matter constitutes "seed lac;" when melted, strained through thick canvas, and spread out into thin layers, this is known as "shell lac," and it is in this last form that the resin is usually brought to European markets. Shell lac, which varies in color from a dark amber to an almost pure black appearance, may be bleached by dissolving in a boiling lye of caustic potash and passing chlorine through the solution till all the resin is precipitated. Bleached lac takes light delicate shades of color, and dyed a golden yellow it is much used in the East Indies for working into chain ornaments for the head and for other personal adornments. Lac is a principal ingredient in sealing wax, and forms the basis of some of the most valuable varnishes, besides being useful in various cements, etc. (see LACQUER). Average stick lac contains about 68 per cent. of resin, 10 of lac dye, and 6 of a waxy substance. The resin of lac is a composite body, whose constituents behave differently in presence of chemical reagents.

LACAILLE, NICOLAS LOUIS DE, a zealous and successful astronomer, was born at Rumigny, near Rheims, March 15, 1713. After he had taken deacon's orders, however, he devoted himself exclusively to science, and, through the patronage of Cassini, obtained employment, first in surveying the coast from Nantes to Bayonne, then, in 1739, in remeasuring the French arc of the meridian. The success of this difficult operation, which occupied two years, and achieved the correction of the anomalous result obtained by the elder Cassini in 1684, was mainly due to Lacaille's industry and skill. He was rewarded by admission to the Academy, and the appointment of mathematical professor in Mazarin college, where he worked diligently for some years in a small observatory fitted up for his use. His desire to observe the southern heavens led him to propose, in 1750, an astronomical expedition to the Cape of Good Hope, which was officially sanctioned, and fortunately executed. (See ASTRONOMY.) On his return in 1754 he withdrew to his former retreat in Mazarin college, where he died March 21, 1762, of an attack of gout, aggravated by unremitting toil.

LA CALLE, or LA CALA, a seaport town of Algeria, in the province of Constantine, the center of the Algerian and Tunisian coral fisheries. Population, 4,000.

LACCADIVES, a group of coral reefs and islands in the Indian Ocean. The name Laccadives (*laksha dwipa*, the "hundred thousand isles") is that given by the people of the continent, and was probably meant to include the myriad Maldives; they are called by the natives simply *Divi*, "islands," or *Amendivi*, from the chief island. There are about nineteen separate reefs, containing, however, only thirteen islands, and of these only eight are inhabited. The islands have in nearly all cases emerged from the eastern and protected side of the reef, and have gradually extended toward the west over the shallow lagoon of which the rest of the space within the barrier-reef consists. The islands are small, none exceeding a mile in breadth, and lie so low that they would be hardly discernible but for the cocoa-nut groves with which they are thickly covered. The soil is light coral sand, beneath which, a few feet down, lies a stratum of coral stretching over the whole of the island. This coral, which is generally a foot to a foot and a half in thickness, has been in the principal islands wholly excavated, whereby the underlying damp sand is rendered available for cereals. These excavations—a work of vast labor—were made at a remote period, and according to the native tradition by giants. In these spaces are cultivated coarse grain, pulse, bananas, and vegetables; cocoa-nuts grow abundantly everywhere, and for rice the natives depend upon the mainland.

Of the eight Laccadive islands, four are directly under British rule and form part of the South Kanara collectorate in the Madras presidency. The other four form part of the estate of the bibi of Cannanore. The population in 1901 was 15,000. Here is the population of the separate islands in 1881:

British Islands.		*Cannamore Islands.*	
Amini	2,060	Agathi	1,376
Chetlat	577	Kawrati	2,127
Kadamat	245	Androt	2,896
Kiltan	790	Kalpeni	1,216
Total	3,672	Total	7,615

LACE is the name applied to an ornamental open work of threads of flax, cotton, silk, gold, or silver, and occasionally of mohair or aloe fiber. Such threads may be either looped or plaited or twisted together in one of three ways:—(1) with a needle, when the work is distinctly known as "needlepoint lace;" (2) with bobbins, pins, and a pillow or cushion, when the work is known as "pillow lace;" and (3) by machinery, when imitations of both needlepoint and pillow lace patterns are produced.

Special patterns for needlepoint and pillow laces date from the beginning of the sixteenth century. From these classes of earlier work lace is descended. Pillow lace can be distinctly traced up to the "merletti a piombini" of the sixteenth century. At a very early period embroidery of geometrical patterns in colored silk, etc., on a network of small square meshes was known and made throughout Europe.

Drawn and cut works were ancient forms of embroidery which directly developed into point lace. The methods of producing them were various. A common way was to fasten on a light frame a reticulation of threads, under which was fastened, by gum or otherwise, a piece of fine lawn. Then along these threads the pattern to be formed was stitched to the lawn background in button-hole stitching, and the superfluous parts of the lawn were afterward drawn or cut away—whence the names "punto a reticella" and "punto tagliato." In other cases no cloth at all was used, and the pattern, consisting of an interlacing framework of threads, was simply sewed over with button-hole stitches. This was "punto in aria." The early geometrical patterns of the "punto a reticella" or "punto tagliato" and "punto in aria" were probably derived from the Ionian Islands and Greece, and the cut-work itself was indeed also known as Greek lace.

It is a noteworthy circumstance that the two widely distant regions of Europe where pictorial art first flourished and attained a high perfection, North Italy and Flanders, were precisely the localities where lace-making first took root, and became an industry of importance, both from an artistic and from a commercial point of view. The invention of pillow lace is generally credited to the Flemings; but there is no distinct trace of the time or the locality. France and England were not behind Venice and Flanders in adopting lace. Henry III. of France (1574–1589) appointed a Venetian, Frederic Vinciolo, to be pattern maker for varieties of linen needle works and laces to his court. Through the influence of this fertile designer the seeds of a taste for lace in France were principally sown. But the event which *par excellence* would seem to have fostered the art of lace-making there was the aid and patronage officially given it in the following century by Louis XIV., acting on the advice of his minister Colbert. The importance of the French designs, which owe so much to the state patronage they enjoyed, was noticed early in the eighteenth century by Bishop Berkeley.

The humble endeavors of peasantry in England (which could boast of no schools of design), Germany, Sweden, Russia, and Spain could not result in work of high artistic pretension. Lace making is said to have been promoted in Russia through the patronage of the court there, after the visit of Peter the Great to Paris in the early days of the eighteenth century. In Germany, Barbara Uttmann, a native of Nuremberg, instructed peasants of the Harz mountains to twist and plait threads in 1561. Spain has been considered to have been a lace-making country, and no doubt a good deal of lace, having, however, no distinctive character, was made in Spanish conventual establishments. The "point d'Espagne," however, appears to have been a commercial name given by French manufacturers of a class of lace greatly esteemed by Spaniards in the seventeenth century. No lace pattern books have been found to have been published in Spain. The point laces which came out of Spanish monasteries in 1830, when these institutions were dissolved, were not distinguishable from similar Venetian-made laces. The lace vestments preserved at the cathedral at Granada hitherto presumed to be of Spanish work are Flemish of the seventeenth century. The industry is not alluded to in Spanish ordinances of the fifteenth, sixteenth, or seventeenth centuries. Much Flemish lace was imported into Spain from Spanish Flanders. The black and white silk pillow laces, or "blondes," date from the eighteenth century.

At present the chief sources of hand-made lace are Belgium, England, and France, but a successful effort has also been made to reëstablish the industry in the island of Burano near Venice, and much fine work of good design is now (1890) made there. Russian peasants in the districts of Vologda, Balakhua (Nijni-Novgorod), Bieleff (Tula), and Mzensk (Orel) make pillow laces of simple patterns. But by far the greatest amount of lace now made is that which issues from machines in England and France. The total number of persons employed in the lace industry in England in 1871 was 49,370; and according to official returns of the year 1873, 240,000 women were similarly employed in France.

The early history of the lace-making machine coincides with that of the stocking-frame, that machine having been adapted about the year 1768 for producing open-looped stitches, which had a net-like appearance. In the years 1808 and 1809 John Heathcoat of Nottingham obtained patents for machines for making bobbin net, which form the real foundation of machine making of lace. These machines were improved on in 1813 by John Leavers, whose lace-making machines are in use at the present time. The application of the celebrated Jacquard apparatus to these net machines has enabled manufacturers to produce all sorts of patterns in thread work in imitation of the patterns for hand-made lace. The latest improvement in machinery for lace-making has resulted in a French machine called the "dentellière."

LACEDÆMON. See LACONIA and SPARTA.

LACÉPÈDE, BERNARD GERMAIN ÉTIENNE DE LA VILLE, COMTE DE, French naturalist, was born at Agen in Guyenne, in 1756, and died in 1825.

LA CHALOTAIS, LOUIS RENÉ DE CARADEUC DE, representative of the French provincial parliaments in their struggles with Louis XV., was born at Rennes in Brittany, March 6, 1701. He entered with keen vigor into the question of the suppression of the Jesuits, which began to be most openly mooted after the affair of Martinique; and as procureur-général of the parliament of Brittany he submitted to the parliament in 1761 and 1762—the very heat of the conflict—two *Comptes Rendus des Constitutions des Jésuites*, which dealt the society some of the most powerful blows it had received since Pascal, and undoubtedly contributed largely to secure the edict of suppression in 1764. He died in 1785.

LACHISH, a town in the low country of Judah, and one of the strong fortresses that offered an obstinate resistance to Nebuchadnezzar. It was to Lachish that Amaziah fled from the conspiracy raised against him at Jerusalem, and there he was killed.

LACHMANN, KARL KONRAD FRIEDRICH WILHELM, a highly distinguished philologist and critic, was born March 5, 1793, at Brunswick. In 1809 he passed to the university at Leipsic as a student of philology and theology; in the same year he transferred himself to Göttingen, where, under the influence of Heyne, his enthusiasm for philological pursuits almost completely extinguished his interest in theology; the pagan classics and particularly the Roman poets became his absorbing study. In January, 1818, he became professor extraordinarius of classical philology in the university of Königsberg, where Lobeck also was; he at the same time began to lecture on Old German grammar and the Middle High German poets. In connection with this task he devoted himself during the following seven years to an extraordinarily minute study of all that could be found, whether in print or in manuscript, relating to these subjects, and in the summer of 1824 he obtained leave of absence in order that he might search the libraries of Middle and South Germany for further materials. In February, 1825, Lachmann was nominated extraordinary professor of classical and German philology in the university of Berlin; in June, 1827, he was promoted to the ordinary professorship in the same department; and in 1830 he was admitted a member of the Academy of Sciences. The remainder of his laborious and fruitful life as an author and a teacher presents no episode requiring special record. In January, 1851, he was seized with an inflammatory affection of the left foot, to which he ultimately succumbed on March 13, 1851.

LA CONDAMINE, CHARLES MARIE DE (1701–1774), French geographer and mathematician, was born at Paris, January 28, 1701.

LACONIA, the name generally applied in modern times to the country which occupied the southeastern corner of Peloponnesus, often called Lacedæmon, which is the only name used in Homer. The history of the district has already been given. (See GREECE).

LACONIA, the county seat of Belknap county, N. H., is twenty-seven miles northeast of Concord. It contains one national and two savings banks, five churches and a high school, and has considerable manufactures of woolen goods, sash, doors and blinds, and a population in 1900 of 8,042.

LACORDAIRE, JEAN BAPTISTE HENRI, French orator, was born at Recey-sur Ource, Côte d'Or, in 1802, and died in 1861.

LACQUER, or LACKER, in general terms may be said to be colored and frequently opaque varnishes applied to certain metallic objects and to wood. The term is derived from the resin lac, which substance is the basis of lacquers properly so called. Technically, among Western nations, lacquering is restricted to the coating of polished metals or metallic surfaces, such as brass, pewter, and tin, with prepared varnishes which will give them a golden, bronze-like, or other luster as do sired. Throughout the East Indies the lacquering of wooden surfaces is universally practiced, large articles of household furniture, as well as small boxes, trays, toys, and papier-mâché objects, being decorated with bright-colored and variegated lacquer. The lacquer used in the East is, in general, variously colored sealing-wax, applied, smoothed, and polished in a heated condition; and by various devices intricate marbled, streaked, and mottled designs are produced. Quite distinct from these, and from all other forms of lacquer, is the lacquer work of Japan. The source and nature of the raw material of Japanese lacquer has been referred to under JAPANNING, and there also will be found some allusion to its extraordinary durability and resistance to all ordinary solvents. Not less extraordinary is the manipulative skill shown by the Japanese in this kind of work, and the variety and exquisite perfection of its decorative treatment, which all go to place Japanese lacquer of high quality among the rarest and most prized treasures of decorative art.

LACRETELLE, CHARLES DE, French historian and journalist, was born at Metz, in 1766, and died in 1855.

LACROSSE is the national ball game of Canada, as cricket is of England and base-ball of the United States of America. The aborigines had the game before the discovery of the New World, and different Indian tribes played it in different manners, generally with much roughness and violence. The present name was given it by French Canadians, owing to the resemblance of the curved netted stick, the chief implement used in the pastime, to a bishop's crozier or *crosse*. As white men gradually took up the game it became more refined. In 1867 the National Lacrosse Association of Canada was formed, and drew up a recognized code of rules. Lacrosse cannot be aptly compared to hockey or football, since striking or even touching the ball with the hands or feet is inadmissible. The crosse somewhat resembles a racket bat. It is a stick with one end curved, and the hook so formed is fitted with network, which must not bag. The ball is of indiarubber, from eight to nine inches in circumference, The other requisites are a level piece of turf, about 200 by 100 yards, and the goals. These may be any distance apart, according to agreement and the space available. Each goal is composed of two flag posts, six feet high and a like distance apart. The usual number of players is twelve on each side, and the captains station them somewhat as in football. A game is scored by one side driving the ball between their opponents' goal posts, and a match is three games out of five. There is no "off side" as in football, and the chief feat of the player is to catch the ball on the network of the crosse, dodge his opponents by running as far as practicable, and then throw the ball to one of his own side who is nearer the enemy's goal. A game is commenced by the ball being placed on the ground midway between the two goals and a player from each side "facing" for it with the crosse till one of them succeeds in sending it on the way to the opposite goal. After each game goals are changed. During winter the game is played by skaters on the ice, or on the snow with the aid of snowshoes. A native Indian team introduced the pastime into England in 1867; several amateur clubs were formed; and a set of rules were drawn up by an English Lacrosse Association February 12, 1868. They differ somewhat from the Canadian regulations—the goal posts being seven feet apart with a tape across the top, and a match being decided by the number of goals won during a specified time. The pastime, however, never took deep root in England, so many other old established games of ball being more popular, and is now but little practiced there. It is played occasionally in the Northern States.

LA CROSSE, chief city of La Crosse county, Wis., is situated on the east bank of the Mississippi at the confluence of the Black and La Crosse rivers, 196 miles by rail west-northwest of Milwaukee. La Crosse is the second commercial city and the fourth in the scale of population in the State. An extensive lumbering trade is carried on by means of the Black river. The city contains foundries, machine-shops, saw-mills, flour-mills, shipbuilding yards, and manufactories of agricultural implements, beer, and leather. It has three English dailies and five weekly newspapers (two English, two Norwegian, one German), twenty churches, and a public library containing 3,300 volumes. La Crosse became a city in 1856. The population was 28,895 (1900 census).

LACRYMATORY, a modern word employed to describe a class of small vessels of terra-cotta, or, more frequently, of glass, found in Roman and late Greek tombs, and fancifully supposed to have been bottles into which mourners dropped their tears. They were used to contain unguents, and it is to the need of unguents at funeral ceremonies that the finding of so many of these vessels in tombs is due. They are shaped like a spindle, or a flask with a long small neck and a body in the form a bulb.

LACTANTIUS FIRMIANUS, also called Lucius Cæcilius or Lucius Cælius Lactantius Firmianus, was a Christian writer who from the beauty of his style has been called the "Christian Cicero." His history is very obscure. His very name is doubtful; his birthplace, whether in Italy or in Africa, is uncertain; it is impossible to say with any accuracy when his writings were published; and the date of his death is unknown.

LACTIC ACID, a chemical term, which, though originally invented to designate the particular acid contained in sour milk, has now, through the discovery of other acids isomeric with and very similar to that acid, acquired a generic, in addition to its original specific, meaning.

LACTOMETER, or GALACTOMETER, a very simple instrument for testing the richness of milk, it consists of a glass tube graduated to 100 parts. New milk is poured in up to the top of the graduated part and allowed to stand; and when the cream has completely separated, the value of its quantity is shown by the number of parts in the 100 which it occupies. Another form of instrument was invented by Doeffel, consisting of a small hydrometer with a scale two inches long divided into twenty degrees, the zero being placed at the point to which the instrument sinks in water, and the twentieth degree corresponding with the 1.0383. This instrument is preferred by the continental chemists; and 14° is held to show milk undiluted with water.

LADAK, one of the outlying governorships of Cashmir, in the valley of the Indus and behind the great central range of the Himalayas. Population, 20,000.

LADAK AND BALTI. The name Ladák (pronounced in Tibetan Lata) belongs primarily to the broad valley of the upper Indus in West Tibet, but includes several surrounding districts in political connection with it. It is bounded north by the Kuenlun range and the slopes of the Karakorum, northwest and west by the Mussulman state of Balti or Little Tibet, southwest by Kashmir, south by British Himalayan terrritory, and east by the Chinese Tibetan provinces of Ngari and Rudók. The whole region lies very high, the valleys of Rukshu in the southeast being 15,000 feet, and the Indus near Lé 11,000 feet, while the average height of the surrounding ranges is 19,000 feet. The proportion of arable and even possible pasture land to barren rock and gravel is very small.

LA DIXMERIE, NICOLAS BRICAIRE DE (1730–

1791), **French man of letters, was a native of Champagne.**

LADOGA, formerly NEVO, a lake of northern Russia, surrounded by the governments of St. Petersburg, Olonetz, and Wiborg. It has the form of a quadrilateral, elongated from northwest to southeast. Its eastern and southern shores are flat and marshy, while the northwestern margin is craggy and fringed by numerous small rocky islands, the largest of which are Valaam and Konevetz, and which occupy altogether an area of 223 square miles, Lake Ladoga is 7,000 square miles in area, that is, thirty-one times as large as the Lake of Geneva; but, its depth being less, it contains only nineteen times as much water as the great lake of Switzerland. The greatest depth, 244 yards, is in a cavity situated in the northwestern part of the lake, the average depth not exceeeding 100 yards. No less than sixty rivers enter Lake Ladoga, pouring into it the waters of numberless smaller lakes which lie at higher levels around it. The Volkhov, which conveys the waters of Lake Ilmen, is the largest; Lake Onega discharges its waters by the Svir; and the Saima system of lakes of eastern Finland contributes the Woxen and Taipala rivers; the Syass brings the waters from the smaller lakes and marshes of the Valdai plateau. Lake Ladoga discharges its surplus water by means of the Neva, which flows from its southwestern corner into the Gulf of Finland, rolling down its broad channel 104,000 cubic feet of water per second.

LADRONE OR MARIANA ISLANDS, a chain of fifteen islands in the North Pacific Ocean, situated to the north of the Carolines. The name Islas de los Ladrones, or "Islands of the Thieves," was given them by the ship's crew of Magellan on account of the thieving propensity of the inhabitants. Magellan himself styled them Islas de las Velas Latinas, or "Islands of the Lateen Sails." San Lazarus archipelago, Jardines, and Prazeres are among the names applied to them by later navigators.

The climate of the Ladrones, though humid, is salubrious, while the heat, being tempered by the trade winds, is milder than that of the Philippines.

LADY DAY, the Feast of the Annunciation of the Virgin Mary. (See ANNUNCIATION.)

LAENNEC, RENÉ THÉODORE HYACINTHE, inventer of the stethoscope, was born at Quimper, in Brittany, February 17, 1781. Early trained to medicine under his uncle at Nantes, he completed his medical studies at Paris, where he received the degree of doctor in 1804. He specially distinguished himself by his researches in pathological anatomy, and was regarded as one of the first practitioners of the capital when, in 1816, he was appointed physician at the Necker hospital. There he continued those researches which resulted in the discovery of the stethoscope in the manner already fully described under AUSCULTATION. Laennec himself fell a victim to phthisis, the disease which, more than all others, he had specially studied. For a few years he was able to occupy a medical chair in the Collége de France; but he died on August 13, 1826.

LAER, or LAAR, PIETER VAN, painter, was born at Laaren, in Holland in 1613 and died in 1675.

LÆSTRYGONES, a mythic race of giants, mentioned in the *Odyssey*. After leaving the island of Æolus, Ulysses reached, in six days, the coast of the Læstrygonians and the city of Lamus, where the paths of day and night approach so close that a sleepless man might make double wages by herding continuously, watching one flock while the other rested. This feature of the tale obviously contains some hint of the long nightless summer in the Arctic regions, which, perhaps, penetrated to the Greeks with the merchants who fetched amber from the Baltic coasts. The Læstrygonians were cannibals; and, when three sailors sent as scouts incautiously entered the city, the king, Antiphates, ate one and the people pursued the others to the ships. As the vessels tried to escape from the harbor, the giants pelted them with masses of rock, and sunk all except the one in which Ulysses was.

LA FARINA, GIUSEPPE (1815–1863), Italian author and politician, was born at Messina, Sicily.

LAFAYETTE, the capital of Tippecanoe county, Indiana, is situated at the head of navigation on the Wabash river, and near the battle-ground of Tippecanoe, where, in 1811, General Harrison, afterward president, defeated a large force of Indians. The city—which is much the largest of the twenty-four towns in the United States named in honor of General Lafayette—is beautifully situated in the center of a rich agricultural region and amid an amphitheater of hills, which are covered with suburban homes. The La Fayette carworks employ 800 men. There are four national banks, three daily and nine weekly newspapers, five large boot and shoe manufactories, four breweries, one distillery, four large cooperage establishments, a paper-mill, pork-houses for summer and winter curing, a horning-mill, iron-works, together with numerous foundries and smaller manufacturing enterprises. The city is supplied with gas and water-works, and sulphur water, valuable for drinking and bathing purposes, flows from an artesian well in the public square. It is the seat of Purdue University, an agricultural college, richly endowed by a congressional land grant, and named in honor of John Purdue, who gave it $150,000. Population (1900), 18,116.

LA FAYETTE or LAFAYETTE, DE, (Marie Jean Paul Roch Yves Gilbert Motier), Marquis, was born at the Château of Chavagniac, in Auvergne, France, September 6, 1757. His father was a maréchal de camp and was killed at the battle of Minden in 1759. The orphan boy married, in 1774, a daughter of the Duc D'Ayen, and entered the king's guards. In 1776 he offered his sword to the infant republic of the United States, and Silas Deane, the American commissioner in Paris, promised him a commission as major-general. La Fayette bought and fitted out a ship for himself and his chosen companions, and was arrested by the French Government at the instance of the British ambassador. He succeeded in escaping and joined the ship in Spain, and with eleven other young Frenchmen sailed for America. Their vessel escaped the British cruisers sent in pursuit, and reached Georgetown, in South Carolina, after a voyage of two months. Thence La Fayette traveled to Philadelphia, where he found the Continental Congress unwilling to carry out the arrangement made by Deane, who was alleged to have exceeded his instructions. The gallant young noble was not to be balked, and offered to serve as a volunteer and without pay. Congress appreciated the importance of the alliance with France, and the substantial pecuniary assistance which was offered, and on July 31, 1777, issued the promised commission. La Fayette was attached to Washington's staff and became a member of his military family. Before the year was out he had taken part in the battle of the Brandywine, where he was shot in the leg. He was made a general of division on the recommendation of Washington, and received the thanks of Congress for his conduct at Monmouth in 1778.

In that year France declared war against England, and La Fayette was sent to France on a mission. He secured material aid, and returned to this country in time to assume the defense of Virginia, and to take an honorable part in the decisive victory of Yorktown in 1781.

He borrowed money from his own bankers to provide his men with necessaries, and conducted his campaign in Virginia in a manner acceptable to Washington.

Peace having been made, La Fayette returned to France, where the fame of his services had preceded him, and the French king gave him the same rank that he had held in the American service, dating his commission from the day of Cornwallis' surrender. In 1784 La Fayette revisited the United States, where he was received with all due honor.

In 1787 he entered political life in France as a member of the chamber of notables, to which his hereditary rank gave him entry. This body gave place to the states-general, and La Fayette, on July 11, 1789, presented to the national assembly, the outgrowth of the states-general, a declaration of the rights of man. This was adopted and marked an important step in the great revolutionary movement. He became commandant of the Parisian militia and afterward of the entire national guard of France, which numbered 3,000,000 of men. For a time he was the idol of the French people. A consistent republican, a friend of order and a devotee of liberty, he for the time saved the lives of the king and queen, and but for the hatred of the reactionaries and the intrigues of the court party might have succeeded in averting the tragedy of 1792. He resigned his commission on July 14, 1790, the first anniversary of the destruction of the Bastille, and was a candidate for the mayoralty of Paris, but was defeated by the intrigues of Marie Antoinette and the *noblesse*. In the winter of 1791–92 he was given command of an army corps to repel the invasion of the Austrians. After the attack on the Tuileries, June 16, 1792, he returned to Paris and denounced the Jacobins at the bar of the assembly. The insurrection of August 10, 1792, gave the ascendancy to the mountain party, and La Fayette was deprived of his command. He fled to Liége and fell into the hands of the Austrians, who detained him as a state prisoner for five years, and treated him very ill. Bonaparte, in 1797, insisted on his liberation and he returned to France in 1800. He refused all offers of public employment made by Napoleon, opposed the assumption by the latter of the life consulate and the imperial title, and lived in retirement.

After the Restoration of 1814 La Fayette became vice-president of the assembly. He remained true to his principles and opposed the reactionary policy of the restored Bourbons.

In 1824 the Marquis de La Fayette was an honored visitor of the United States. President and people combined to do honor to the man who fifty years before had shed his blood in defense of the infant liberties of the colonies. Congress voted him a township of land and a gift of $200,000, and his progress through the country was one continued triumph. After his return to Paris he opposed the arbitrary actions of Charles X., and during the revolution of 1830 he again commanded the national guard. He acquiesced in the formation of the monarchy of the Orleans family as being, in his opinion, at that time the most opportune form of government for France. But he never swerved from his republican principles, and no man ever questioned his absolute sincerity and sterling honesty. He died at Paris, May 20, 1834.

LA FLÈCHE, chief town of an arrondissement in the department of Sarthe, France, is situated on the right bank of the Loir, about twenty-four miles southwest of Le Mans. Population, 8,000.

LA FONTAINE, Jean de, one of the most popular and original of French poets, was born at Château Thierry, in Champagne, probably on July 8, 1621, and died at Paris on April 13, 1695. Jean, who was the eldest child of his parents, was educated at the *collège* (grammar-school) of his native town, and at the end of his school days he had, singularly enough, an idea of taking orders. He entered the Oratory in May, 1641, and the seminary of St. Magloire in October of the same year; but a very short sojourn proved to him that he had mistaken his vocation. He then apparently studied law, and is said to have been admitted as *avocat*, though there does not seem to be actual proof of this. He was, however, settled in life, or at least might have been so, somewhat early.

Even in the earlier years of his marriage, which occurred in 1647, La Fontaine seems to have been much at Paris, but it was not till about 1656 that he became a regular visitor to the capital. The duties of his office—that of maitre des eaux et forêts—which were only occasional, were compatible with this non-residence, and he continued to hold it till 1672. It was not till he was past thirty that his literary career began, for he was by no means a precocious writer. His first serious work was a translation or adaptation of the *Eunuchus* of Terence (1654). At this time the Mæcenas of French letters was the superintendent Fouquet, to whom La Fontaine was introduced by Jacques Jannart, a connection of his wife's. Few people who had paid their court to Fouquet went away empty-handed, and La Fontaine soon received a pension of 1,000 livres (1659), in repayment, possibly, of the poem of *Adonis* which in 1658 he had, in manuscript, dedicated to the financier. His first work of real importance, the first book of the *Contes*, appeared in 1664. It was about this time that the quartet of the Rue du Vieux Colombier, so famous in French literary history, was formed. It consisted of La Fontaine, Racine, Boileau, and Molière, the last of whom was almost of the same age of La Fontaine, the other two considerably younger. Chapelle was also a kind of outsider in the coterie. The coterie furnished under feigned names the personages of La Fontaine's version of the Cupid and Psyche story, which, however, with *Adonis*, was not printed till 1669. In 1664 he was regularly commissioned and sworn in as gentleman to the duchess dowager of Orleans, and was installed in the Luxembourg. He still retained his rangership, and in 1666 we have something like a reprimand from Colbert suggesting that he should look into some malpractices at Château Thierry. In the same year appeared the second book of the *Contes*, and in 1668 the first six books of the *Fables*, with more of both kinds in 1671.

The next event of importance in La Fontaine's life, apart from the publication of his works, did not occur till after nearly ten years. In 1682 he was a man more than sixty years old, recognized as one of the first men of letters of France. Madame de Sévigné, one of the soundest literary critics of the time, and by no means given to praise mere novelties, had spoken of his second collection of *Fables* published in the winter of 1678 as divine; and it is pretty certain that this was the general opinion. It was not unreasonable, therefore, that he should present himself to the Academy, and, though the subjects of his *Contes* were scarcely calculated to propitiate that decorous assembly, while his attachment to Fouquet and to more than one representative of the old Frondeur party made him suspect to Colbert and the king, most of the members were his personal friends. He was first proposed in 1682, but was rejected for Dangeau. The next year Colbert died and La Fontaine was again nominated. Boileau was also a candidate, but the first ballot gave the fabulist sixteen votes against seven only for the critic. The king, whose assent was necessary, not merely for election but for a second ballot in case of the failure of an absolute majority, was ill-pleased, and the election was left pending. Another vacancy occurred, however, some months later, and to this Boileau was elected. La Fontaine died on April 13, 1695, at the age of seventy-three. He was buried in the cemetery of the Holy Innocents. His wife survived him nearly fifteen years, and his posterity lasted until the present century.

LAFOSSE, CHARLES DE, French painter, was one of the most noted and least servile pupils of Lebrun, under whose direction he shared in the chief of the great decorative works undertaken in the reign of Louis XIV. He was born at Paris in 1640, and left France for Italy in 1662. He then spent two years in Rome and three in Venice, and the influence of his prolonged studies of Veronese is evident in his *Finding of Moses* (Louvre), and in his *Rape of Proserpine* (Louvre), which he presented to the Academy as his diploma picture in 1673. During his latter years Lafosse executed many other important decorations in public buildings and private houses, notably in that of Crozat, under whose roof he died on December 13, 1716.

LAGO MAGGIORE. See MAGGIORE.

LAGOS, a town in the district of Faro, which is coëxtensive with the province of Algarve, in Portugal, is situated on the south coast of the kingdom, on a bay which forms its harbor. Population, 8,600.

LAGOS, a British settlement on the west coast of Africa, united since 1876 with the Gold Coast colony, and by the terms of the charter comprising all British possessions between the second and fifth degrees of east longitude. The actual settlement is situated on a low island within the mouth of the so-called Lagos river, which is really a lagoon of considerable extent, into which the Ogun and several other rivers discharge. The seaward entrance is about three miles wide, but it requires skillful pilotage to take a vessel across the bar into the smooth and deep water. Lagos was formerly the chief seat of the slave trade in the Bight of Benin. In 1851 it was captured by the British, and in 1861 the "king" Docemo was practically constrained to give up his territorial jurisdiction, and accept a pension of 1,200 bags of cowries, or about $5,000. Pop. of town, 42,000; of protectorate (1901), about 1,500,000.

LAGRANGE, JOSEPH LOUIS, a mathematician of the highest rank, was born at Turin, January 25, 1736. He was of French extraction. The genius of Lagrange did not at once take its true bent. His earliest tastes were literary rather than scientific, and he learned the rudiments of geometry during his first year at the college of Turin, without difficulty, but without distinction. The perusal of a tract by Halley roused his enthusiasm for the analytical method, of which he was destined to develop the utmost capabilities. At the age of nineteen he communicated to the celebrated Euler his idea of a general method of dealing with "isoperimetrical" problems, known later as the Calculus of Variations. It was eagerly welcomed by the Berlin mathematician, who had the generosity to withhold from publication his own further researches on the subject, until his youthful correspondent should have had time to complete and opportunity to claim the invention. This prosperous opening gave the keynote to Lagrange's career. Appointed, in 1754, professor of geometry in the royal school of artillery, he formed with some of his pupils—for the most part his seniors—friendships based on community of scientific ardor. With the aid of the Marquis de Saluces and the eminent anatomist Cigna, he founded, in 1758, a society which rose later to the dignity of the Turin Academy of Sciences. The first volume of its memoirs, published in the following year, contained a paper by Lagrange, entitled, *Recherches sur la nature et la propagation du son*, in which the power of his analysis and his address in its application were equally conspicuous. Without assumption, but without hesitation, he made his first appearance in public as the critic of Newton, and the arbiter between D'Alembert and Euler. By considering only the particles of air found in a right line, he reduced the problem of the propagation of sound to the solution of the same partial differential equations that include the motions of vibrating strings, and demonstrated the insufficiency of the methods employed by both his great contemporaries in dealing with the latter subject. He further treated in a masterly manner of echoes and the mixture of sounds, and explained the phenomenon of grave harmonics as due to the occurrence of beats so rapid as to generate a musical note. He is justly regarded as the inventor of the "method of variations," a name supplied by Euler in 1766.

By these performances Lagrange found himself, at the age of twenty-six, on the summit of European fame. In 1764 he won the prize offered by the Paris Academy of Sciences for the best essay on the libration of the moon. His success encouraged the Academy to propose, in 1766, as a theme for competition, the hitherto unattempted theory of the Jovian system. The prize was again awarded to Lagrange; and he subsequently earned the same distinction with essays on the problem of three bodies, in 1772, on the secular equation of the moon in 1774, and in 1778 on the theory of cometary perturbations.

He had in the meantime gratified a long-felt desire by a visit to Paris, where he enjoyed the keen and stimulating delight of conversing with such mathematicians as Clairaut, D'Alembert, Condorcet, and the Abbé Marie. The post of director of the mathematical department of the Berlin Academy (of which he had been a member since 1759) becoming vacant by the removal of Euler to St. Petersburg, both he and D'Alembert united, by unpremeditated concert, to recommend Lagrange as his successor. On November 6, 1766, Lagrange was installed in his new position, with a salary of 6,000 francs, ample leisure for scientific research, and an amount of royal favor sufficient to secure him respect without exciting envy. The national jealousy of foreigners, it is true, was a source of annoyance to him; but such prejudices were gradually disarmed by the mild inoffensiveness of his demeanor, and by his strict adherence to a policy of non-intervention outside his own immediate domain.

The long series of memoirs—some of them complete treatises of great moment in the history of science—communicated by Lagrange to the Berlin Academy between the years 1767 and 1787 were not the only fruit of his exile on the banks of the Spree. The *Mécanique Analytique*, the production in which his genius most fully and characteristically displayed itself, was due to the same period. This great work was the perfect realization of a design present to the mind of its author almost from boyhood, and of which he had given a clear though concise sketch in his first published essay.

A publisher having with some difficulty been found, the book appeared in Paris, under the supervision of Legendre, in 1788. After the death of Frederick the Great, his presence was competed for by the courts of France, Spain, and Naples, and a residence in Berlin having ceased to possess any attraction for him, he removed to Paris in 1787. His reception was most flattering. Marie Antoinette warmly patronized him. Even from the revolutionary tribunals the name of Lagrange uniformly commanded respect. His pension was continued by the National Assembly, and he was partially indemnified for the depreciation of the currency by remunerative appointments. Nominated president of the Academical commission for the reform of weights and measures, his services were retained when its "purification" by the Jacobins removed his most distinguished colleagues. He again sat on the commission of 1799 for the actual construction of the metrical system, and by his zealous advocacy of the decimal principle of subdivision largely contributed to its adoption.

Although specially exempted from the operation of the decree of October, 1793, imposing banishment on foreign residents, he took alarm at the fate of Bailly and Lavoisier, and prepared to resume his former situation in Berlin. His design was frustrated by the establishment of and his official connection with the École Normale, and then the École Polytechnique.

On the establishment of the Institute, Lagrange was placed at the head of the section of geometry; he was one of the first members of the Bureau des Longitudes; and his name appeared in 1791 on the list of foreign members of the Royal Society. Bonaparte, who styled him "la haute pyramid des sciences mathématiques" loaded him with personal favors and official distinctions. He became a senator, a count of the empire, a grand officer of the Legion of Honor, and just before his death received the grand cross of the order of Reunion.

The preparation of a new edition of his *Mécanique*, to which he devoted himself with extraordinary zeal, exhausted his already failing powers. He died April 10, 1813, at the age of seventy-seven, and was buried in the Pantheon, the funeral oration being pronounced by Laplace and Lacépède.

LAGRENÉE, Louis Jean François (1724–1805), French painter, was a pupil of Carle Vanloo.

LAHIRE, Laurent de (1606–1656), French painter, was born at Paris.

LAHORE, or Lahór, capital of the Punjab, India, gives its name to a civil division of the British territory in that province, and to the headquarters district of the division.

Lahore Division.—This division, the most central of the ten into which British Punjab is divided, is fourth in order of size, 8,961 square miles, and fifth in respect of population, 1,889,495, averaging 211 to the square mile. The Lahore division has three districts—Lahore, Firózpúr, Gujránwála. The whole area is alluvial plain, for the most part devoid of trees, except such as have been planted since British occupation. It is intersected by the rivers Rávi and Sutlej, and the Bári Doáb canal drawn from the Rávi at the foot of the hills; also by the old bed of the Biás river deserted about the middle of last century. The Chenáb river is the boundary of the northwest, between the Lahore and the Ráwal Pindi divisions. Of the towns in the division there are five which have over 10,000 inhabitants, namely, Lahore, Kasúr, Gujránwála, Wazírábád, Firózpúr. The common language of the rural population and of artisans is Punjabi. Urdu (Hindustani) is the language of the better educated classes, and is everywhere becoming more generally understood and used.

So far from the seaboard, the range between extremes of winter and summer temperature is great. The rainfall is uncertain as well as scanty. The harvests are greatly dependent on irrigation. The prevailing winds are westerly (northwest and southwest) in the hot weather, and easterly (east and northeast) in the cold season. The Lahore division became British territory in March, 1849, on the annexation of the part of the Punjab west of the Biás river, at the close of the second Sikh war.

Lahore District has an area of 3,648 square miles, with a population of 789,666. Of this number about 3,000 are Europeans and Eurasians, residing chiefly at Lahore and its cantonment of Mián Mír. The district contains 1,455 villages, with an agricultural population of 354,012. The gross revenue is £110,518—£74,353 being derived from the land. Of the area 1,165,440 acres are under cultivation, 811,520 uncultivated, and 357,760 uncultivable. Of the uncultivated area nearly 237,000 acres are unappropriated cultivable waste land, the property of the government. Irrigation is supplied to upward of 180,000 acres by the Bári Doáb canal and three inundation canals from the Sutlej (filled for a certain time each year by the rise of the river), which are government works, and about 267,000 acres are watered by private wells.

Lahore City lies on the left bank of the river Rávi, about 900 feet above the sea-level. It is a walled town, about one and one-fourth miles in length from west to east, and about three-fourths of a mile in breadth from north to south. The intramural population is 98,924; with the suburbs Anarkali, Muzank, and Ichra, the pop. (1901) was 120,058. The houses are of brick, irregular in construction, three and more stories in height, many of them with projecting balconies and lattice windows ornamented with varieties of carved woodwork.

LAHR, chief town of an official district in the circle of Offenburg, Baden, is situated on the Schutter, about nine miles south of Offenburg. Pop. (1901), 13,600.

LAIBACH, or Laybach, capital of the duchy of Carniola, Austria, is situated on the Laibach near its influx into the Save, and on the Crown Prince Rudolph and Austrian Southern Railways, forty-five miles northeast of Trieste. The civil population is 24,618; together with the military (1901), 36,547. The native language is Slovenian, but the educated classes speak German or Italian.

LAING, Alexander Gordon (1793–1826), an African explorer, was born at Edinburgh.

LAING, David (1793–1878), a distinguished Scottish antiquary, especially eminent for his biographical knowledge, was born in Edinburgh.

LAING, Malcolm (1762–1818), a Scottish historian, was born at his paternal estate on the Mainland of Orkney.

LAI-YANG, a city in the Chinese province of Shantung, situated in about the middle of the eastern peninsula, on the highway running south from Che-foo to Kin-Kea or Teng-tsi harbor. There are extensive suburbs both in the north and south, and the total population is estimated at 50,000. Pongee silk is the chief manufacture. Gold abounds in the district and is obtained by washing.

LAKE. (For description of the American Lakes, see Art. "St. Lawrence.") When a stream in its course meets with a depression in the land it flows into it and tends to fill it up to the lip of its lowest exit. Such a depression, with its contents of practically stagnant water, constitutes a lake, and its water would be fresh. In warm, dry regions, however, such as are frequently met with in tropical latitudes, it might easily happen that the evaporation from the surface of the depression, supposed filled with water, might be greater than the supply from the feeding stream and from rain falling on its surface. The level of the waters in the depression would then stand at such a height that the evaporation from its surface would exactly balance the supply from streams and rain. We should have as the result a lake whose waters would be salt. Lakes of the first kind may be considered as enlargements of rivers, those of the second kind as isolated portions of the ocean; indeed, salt lakes are very frequently called seas, as the Caspian and the Dead Sea. The occurrence of freshwater lakes and salt lakes in the same drainage system is not uncommon. In this case the salt lake forms the termination. Well-known examples of this are Lake Titecaca and the Desaguadaro in South America, and Lake Tiberias and the Dead Sea on the Jordan.

Although there are few countries where lakes are entirely absent, still it requires little study to see that they are much more thickly grouped in some places than in others. Of the larger lakes, for instance, we have the remarkable group in North America, which together form the greatest extent of fresh water in the world. A similar group of immense lakes is found in Central Africa—Lakes Victoria Nyanza, and Albert Nyanza, whose overflow waters go to form the Nile; Lake Tanganyika, at the source of the Congo; and Lake Nyassa, on a tributary to the Zambesi. In Asia the largest freshwater lake is Lake Baikal, on the upper waters of the Lena. All these freshwater lakes of great size are at the sources of large and important rivers; the salt lakes in which Asia also abounds are at the mouths of large rivers, as the Caspian at the mouth of the Volga, and Aral Sea at the mouth of the Oxus.

Lagoons, found on all low sandy coasts, owe their origin to the shifting of the sand under the influence of the wind and tide. They are found at the mouths of large rivers, as on the Baltic and at the mouth of the Garonne.

In volcanic regions lakes are not uncommon, generally of a more or less circular form, and either occupying the site of extinct craters or due to subsidences consequent on volcanic eruptions; such are the Maare of the Eifel in Germany, and many lakes in Italy and in the Azores.

Lakes are not only widely distributed in latitude and longitude, they also occur at all elevations. Indeed, as a certain elevation above the sea produces an effect as regards climate equivalent to a certain increase of latitude, we find lakes existing in the center of continents, and on high plateaus and mountain ranges, in latitudes where they would be speedily dried up if at the level of the sea. Many of the lakes in Scotland (as Lochs Lomond, Morar, Coruisk), of Norway, of British Columbia, and of southern Chili are raised only by a few feet above the level of the sea, and are separated from it often by only a few hundred yards of land, while in the Cordilleras of South America we have Lake Titicaca 12,500 feet, and in Asia Lake Kokonor 10,500 feet above the sea. Many lakes whose surface is raised high above the level of the sea are so deep that their bottom reaches considerably below that level.

By far the largest continuous sheet of fresh water is the group of North American lakes, and of these Lake Superior is more than double the size of any of the others; this is principally due to its great breadth, as it is very little longer than Lake Michigan. Lake Superior communicates with Lakes Michigan and Huron, which are really branches of one and the same lake, by the St. Mary's river, the fall being forty-nine feet from Superior to Huron. Huron empties itself into Erie by the St. Clair river, Lake St. Clair, and finally the Detroit river. Lake Erie overflows by the Niagara river and falls into Lake Ontario, whence the water finally is conveyed to the sea by the St. Lawrence. The area of the lakes together is in round numbers 100,000 square miles, and, if that of the St. Lawrence and its estuary be added, the water area will be about 150,000 square miles, while the whole drainage area is only 537,000 square miles. Hence of the water conveyed by the St. Lawrence to the sea, rather more than one-fourth falls on the surface of the water itself. Looking to their great extent, we should have suspected them to be much deeper than is found to be the case. The deepest, Lake Superior, is no deeper than Loch Morar in Inverness-shire, Scotland. Comparatively shallow, however, as they are, the bottoms of them all, with the exception of Erie, are several hundred feet below the level of the sea. It has been supposed that in former times this chain of lakes formed an arm of the sea similar to the Baltic in Europe, and in support of this view we have the fact of the discovery of marine forms in Lake Michigan.

In Asia Lake Baikal is in every way comparable to the great American lakes as regards size. Its area of over 9,000 square miles makes it about equal to Erie in superficial extent, while its enormous depth of over 4,000 feet makes the volume of its waters almost equal to that of Lake Superior. Although its surface is 1,360 feet above the sea-level, its bottom is 2,720 feet below it. A former connection with the ocean has been claimed for this lake, owing to the fact that seals inhabit its waters. Other large lakes in Asia are mostly salt, and some lie wholly below the level of the sea. Thus the Caspian lies eighty-five feet below the Black Sea, and the bottom at its greatest depth is 3,600 feet deeper. The Dead Sea is over 1,300 feet deep, and its surface is 1,272 feet below the Mediterranean, so that its bottom is 2,580 feet below the level of the sea. In the Caspian seals are found. A former connection with the Red Sea has been claimed for the Dead Sea, but this is disallowed by Peschel and others. The Jordan valley, with the sea of Tiberias and the Dead Sea, lie on the line of an extensive fault, and it is claimed that this depression in the surface occurred with the production of the fault. Further evidence in support of the statement that the Dead Sea was never connected with the sea is of a negative character, and consists chiefly in the fact that marine forms have not been found in the waters of the Jordan or of Lake Tiberias, and that silver is absent from the waters of the Dead Sea.

A former connection with the ocean is claimed for a number of the Swiss and Italian lakes by Doctor Forel and Professor Pavesi, and the Norwegian lakes by Loven and Sars, on the ground of the occurrence of marine forms of the crustaceans and other classes.

As the water supply of lakes depends on the rainfall, and as this varies much with the season, and from year to year, we should expect, and indeed we find, fluctuation of level in all lakes. There are, however, other changes of level which are independent of the water supply, and which resemble tides in their rhythmic periods. They have long been known and observed in Switzerland, and especially on the Lake of Geneva, where they are known by the name of "seiches." The level of the lake is observed to rise slowly during twenty or thirty minutes to a height which varies from a few centimeters to as many decimeters; it then falls again slowly to a corresponding depth, and rises again slowly, and so on.

In all lakes there are changes of level corresponding with periods of rain and of drought. They are the more considerable the greater the extent of country draining into them, and the more constrained the outflow. In the great American lakes, which occupy nearly one-third of their drainage area, the fluctuations of level are quite insignificant; in Lake Michigan the United States surveyors give as the maximum and minimum yearly range 1.64 and 0.65 feet. In the Lake of Geneva the mean annual oscillation is five feet, and the difference between the highest and the lowest waters of this century is 9.3 feet. The most rapid rise has been 3.23 inches (82 mm.) in twenty-four hours. A very remarkable exception to the rule that large freshwater lakes are subject to small variations of level is furnished by Lake Tanganyika in Central Africa.

As might be expected, in salt lakes which have no overflow, the yearly rise and fall are often considerable. In the Great Salt Lake in Utah, the greatest depth of which is fifty-six feet, changes of level are accompanied by great changes in water surface, and also in saltness of water. In the rainy season the Dead Sea stands ten or twelve feet higher than in the dry season.

LAKE CHARLES. capital of Calcasieu Parish, Louisiana, is a thriving little town with a pop. (1900) of 6,680. It owes its advancement to its location in the center of a valuable lumber district.

LAKE DWELLINGS, as their name implies, are habitations constructed, not on the dry land, but within the margins of lakes or creeks at some distance from the shore. The villages of the Guajiros in the Gulf of Maracaibo are described by Goering as composed of houses with low sloping roofs, perched on lofty piles, and connected with each other by bridges of planks. Each house consisted of two apartments; the floor was formed of split stems of trees set close together and covered with mats; they were reached from the shore by dug-out canoes poled over the shallow waters; a notched tree trunk served as a ladder; and the piles were so firmly driven that no shakiness was perceptible even when the houses were crowded with people. In such a climate the advantages of dwelling in houses so situated are obvious. The custom is common both in the Gulf of Maracaibo and in the estuaries of the Orinoco and Amazon; indeed, the name of the province of Venezuela was given to it from the prevalence of these pile-dwellings along its shores. A similar system prevails in New Guinea. D'Urville describes four such villages in the Bay of Dorei, containing from eight to fifteen blocks or clusters of houses. each block separately built on piles, and consisting of a row of distinct dwellings accommodating a number of families. Cameron describes three villages thus built on piles in Lake Mohrya in Central Africa, the motive here being to prevent surprise by bands of slave-catchers. Similar constructions have been described by travelers, among the Dyaks of Borneo, in Celebes, in the Caroline Islands, on the Gold Coast of Africa, and in other places. Historians have referred to the former existence of the custom in Europe and Asia. Hippocrates, writing in the fifth century B.C., says of the people of the Phasis, that their country is hot and marshy and subject to frequent inundations, and that they live in houses of timber and reeds constructed in the midst of the waters, and use boats of a single tree trunk. Herodotus, writing also in the fifth century B.C., describes the people of Lake Phrasias as living in houses constructed on platforms supported on piles in the middle of the lake, which are approached from the land by a single narrow bridge. Abulfeda, the geographer, writing in the thirteenth century, notices the fact that part of the Apamæan Lake was then called the Lake of the Christians, because it was inhabited by Christian fishermen, who lived on the lake in wooden huts built on piles.

The records of the wars in Ireland in the sixteenth century show that the petty chieftains of that time had their defensive strongholds constructed in the "freshwater lochs" of the country, and there is record evidence of a similar system in the western parts of Scotland.

Similar researches on the Continent have also established the fact that in prehistoric times nearly all the shallow lakes of Switzerland, and many in the adjoining countries—in Savoy and the north of Italy, in Austria and Hungary, and in Mecklenburg and Pomerania—were peopled, so to speak, by lake-dwelling communities, living in villages constructed on platforms supported by piles, at varying distances from the shores. The principal groups are those in the Lakes of Bourget, Geneva, Neuchatel, Bienne, Zurich, and Constance lying to the north of the Alps, and in the Lakes Maggiore, Varese, Iseo, and Garda lying to the south of that mountain range.

In some of the larger lakes the number of settlements has been very great. Fifty are enumerated in the Lake of Neuchatel, thirty-two in the Lake of Constance, twenty-four in the Lake of Geneva, and twenty in the Lake of Bienne. Some of these settlements have been of considerable size. The site of the lake-dwelling of Wangen, in the Untersee, Lake of Constance, forms a parallelogram more than 700 paces in length, by about 120 paces in breadth. The settlement at Morges, which is one of the largest in the Lake of Geneva, is 1,200 feet long by 150 feet in breadth. The settlement of Sutz, one of the largest in the Lake of Bienne, extends over an area of six English acres, and was connected with the shore by a gangway nearly 100 yards long and about 40 feet wide.

LAKE OF THE THOUSAND ISLANDS, an expansion of the St. Lawrence (q.v.) extending about forty miles below Lake Ontario. It contains some 1,500 rocky islets, the largest, Wolfe Island (48 square miles; population, 2,383) measuring twenty-one miles by seven.

LAKE OF THE WOODS, a large lake of North America, studded with numerous wooded islands, in 49° N. lat. and 95° W. long. It is mostly in Ontario, but extends also into Manitoba and Minnesota. The lake is nearly 100 miles long, and about 300 in circuit.

LAKHIMPUR, or LUCKIMPOOR, a British district in the extreme east of the province of Assam, lies along both banks of the Brahmaputra, which belongs to the district for about 400 miles of its course. The Brahmaputra is navigable for steamers in all seasons as far as Dibrugarh, in the rainy season as far as Sadiya; its navigable tributaries within the district are the Subansiri, Dibru, and Buri Dihing. The greater part of the area (11,500 square miles) is sparsely occupied by independent hill tribes, and only 3,200 square miles are directly under British administration. The population of the settled district in 1889–90 was 141,267, residing in 125 villages.

LALANDE, JOSEPH JÉRÔME LEFRANÇAIS DE, a noted astronomer, was born at Bourg (department of Ain), July 11, 1732. He became the zealous and favored pupil of both Delisle and Lemonnier. He, however, completed his legal studies, and was on the point of returning to Bourg to practice there as an advocate, when Lemonnier obtained permission to send him, in his own place, to Berlin, for the purpose of making observations on the lunar parallax in concert with those of Lacaille at the Cape of Good Hope. The successful execution of his task procured for him, before he was twenty-one, admission to the Academy of Berlin, and the post of adjunct astronomer to that of Paris. He now devoted himself to the improvement of the planetary theory, publishing, in 1759, a correct edition of Halley's tables, with a history of the celebrated comet, whose return in that year he had aided Clairaut to calculate. In 1762, Delisle resigned in his favor the chair of astronomy in the Collége de France, the duties of which were discharged by Lalande with *éclat* during forty-six years. His house became an astronomical seminary, and among his pupils were Delambre, Piazzi, Mechain, and his own nephew, Michel Lalande. By his publications in connection with the transit of 1769 he won great and, in some respects, deserved fame. He died April 4, 1807.

LALITPUR, or LULLITPOOR, a British district in the lieutenant-governorship of the Northwestern Provinces, India. In 1865 the population was 248,146; in 1898 it was only 212,661, while the number of villages had fallen from 750 to 646.

LALLY, Thomas Arthur, Baron De Tollendal, Count de, French general, descended from an old Irish family who emigrated to France along with the Stuarts, was born in Dauphiné in January, 1702. His father, colonel in an Irish-French regiment, familiarized him with active service from his boyhood, and he rose, step by step, in a career distinguished for bravery and conduct till, in 1744, he was created a brigadier by Louis XV. on the field of Fontenoy. Previous to this he had been engaged in several plots for the restoration of the Stuarts, and, in 1745, he accompanied Charles Edward to Scotland, serving as aide-de-camp at the battle of Falkirk. Escaping in disguise to France, he joined the army of Marshal Saxe in the Low Countries, and, for his conduct at the capture of Maestricht, in 1748, received the grade of marshal of the camp. When the French, in 1756, resolved to fit out an expedition to recover their power in India, Lally was appointed to the chief command. Arriving at Pondicherri, in 1758, he alarmed the English by his first successes, and even laid siege to Madras. This city was relieved by a British fleet, and the English, under Coote, assumed the offensive, and inflicted a severe defeat on Lally at Wandiwash. He still made a long and stubborn resistance, but was ultimately besieged in Pondicherri, and compelled to surrender in January, 1761. Returning to France on parole, he was thrown into prison. Popular indignation at the collapse of French power in India demanded a victim, and the parliament of Paris sentenced him to death on a vague and frivolous accusation. The judicial murder of Lally (May 9, 1766) was exposed by Voltaire, and his son, Lally-Tollendal, obtained, in 1778, the formal reversal of the sentence.

LAMAISM is partly religious, partly political. Religiously it is the corrupt form of Buddhism prevalent in Tibet and Mongolia. It stands in a relationship to primitive Buddhism similar to that in which Roman Catholicism, so long as the temporal power of the pope was still in existence, stood to primitive Christianity. The ethical and metaphysical ideas most conspicuous in the doctrines of Lāmāism are not confined to the highlands of Central Asia, they are accepted in great measure also in Japan and China. It is the union of these ideas with a hierarchical system, and with the temporal sovereignty of the head of that system in Tibet, which constitutes what is distinctively understood by the term Lāmāism. Lāmāism is hardly calculated to attract much attention for its own sake. Tibetan superstitions and Tibetan politics are alike repugnant to Western minds. But, as so many unfounded beliefs and curious customs have a special value of their own to the student of folklore, so Lāmāism has acquired a special interest to the student of comparative history through the instructive parallel which its history presents to that of the Church of Rome.

When the Dalia Lāma dies it is necessary to ascertain in whose body the celestial being whose outward form has been dissolved has been pleased again to incarnate himself. For that purpose the names of all male children born just after the death of the deceased Great Lāma are laid before his survivor. He chooses three out of the whole number; their names are thrown into a golden casket provided for that purpose by a former emperor of China. The Chutuktus, or abbots of the great monasteries, then assemble, and after a week of prayer, the lots are drawn in their presence and in presence of the surviving Great Lāma and of the Chinese political resident. The child whose name is first drawn is the future Great Lāma; the other two receive each of them 500 pieces of silver. The Chutuktus just mentioned correspond in many respects to the Roman cardinals. Like the Great Lāmas, they bear the title of Rinpotshe or Glorious, and are looked upon as incarnations of one or other of the celestial Bodisats of the Great Vehicle mythology. Their number varies from ten to a hundred; and it is uncertain whether the honor is inherent in the abbacy of certain of the greatest cloisters, or whether the Dalia Lāma exercises the right of choosing them. Under these high officials of the Tibetan hierarchy there come the Chubal Khāns, who fill the post of abbot to the lesser monasteries, and are also incarnations. Their number is very large; and there are but few monasteries in Tibet or in Mongolia who do not claim to possess one of these living Buddhas. Besides these mystical persons there are in the Tibetan Church a number of other ranks and degrees, corresponding to the deacon, full priest, dean, and doctor of divinity in the West. At the great yearly festival at Lhasa they make in the cathedral an imposing array, not much less magnificent than that of the clergy in Rome; for the ancient simplicity of dress has quite disappeared in the growing differences of rank, and each division of the spiritual army is distinguished in Tibet, as in the West, by special uniform. The political authority of the Dalia Lāma is confined to Tibet itself, but he is the acknowledged head also of the Buddhist Church throughout Mongolia and China. He has no supremacy over his co-religionists in Japan, and even in China there are many Buddhists who are not practically under his control or influence.

LAMA-MIAU, or Dolanor, one of the chief cities of Inner Mongolia, is situated 150 miles north of Peking, in a barren sandy plain watered by the Urtingol, a tributary of the Shandugol.

LAMARCK, Jean Baptiste Pierre Antoine de Monet, Chevalier de, a celebrated French naturalist, was born August 1, 1744, at Bazantin, a village of Picardy. He went to Paris and began the study of medicine, supporting himself by working in a banker's office. He early became interested in meteorology and in physical and chemical speculations of a chimerical kind, but happily threw his main strength into botany, and in 1778 published his *Flore Française*, a work in which by a dichotomous system of contrasting characters he enabled the student with facility to determine species. This work, which went through several editions and long kept the field, gained for its author immediate popularity as well as the honor of admission to the Academy of Sciences.

In 1781 and 1782, under the title of botanist to the king, an appointment obtained for him by Buffon, whose son accompanied him, he traveled through various countries of Europe, extending his knowledge of natural history; and on his return he began those elaborate contributions to botany on which his reputation in that science principally rests, namely, the *Dictionnaire de Botanique* and the *Illustrations de Genres*, voluminous works contributed to the *Encyclopédie Méthodique* (1785). In 1793, when he was already forty-nine years of age, in consequence of changes in the organization of the natural history department at the Jardin du Roi, where he had a botanical appointment since 1788, Lamarck was presented to a zoölogical chair, and called on to lecture on the *Insecta* and *Vermes* of Linnæus, the animals for which he introduced the term *Invertebrata*, still employed. Thus driven, comparatively late in life, to devote his principal attention to zoölogy instead of botany, he had the misfortune soon after to suffer from impaired vision; and the malady progressing resulted subsequently in total blindness. Yet his greatest zoölogical work, the *Histoire Naturelle des Animaux sans Vertèbres*, was published from 1815 to 1822, with the assistance, in the last two volumes, of his eldest daughter and of M. Latreille. A volume of plates of the fossil shells of the neighborhood of Paris was collected in 1823 from his memoirs in the *Annales des Muséum*. He died December 18, 1829.

LAMARTINE, ALPHONSE MARIE LOUIS DE PRAT DE, poet, historian and statesman, was born at Mâcon on October 21, 1790, and died at Passy on March 1, 1869. The family of Lamartine was good, and the title of Prat was taken from an estate in Franche Comté. His father was imprisoned during the Terror, and only released owing to the events of the ninth Thermidor. Lamartine's early education was received from his mother. He was sent to school at Lyons in 1805, but not being happy there was transferred to the care of the Pères de la Foi at Belley, where he remained until 1809. For some time afterward he lived at home, reading romantic and poetical literature, but in 1811, being then twenty years old, he set out on his travels for Italy, where he seems to have sojourned for nearly two years. His family having been steady royalists, he entered the Gardes du corps at the return of the Bourbons, and during the Hundred Days he sought refuge first in Switzerland and then at Aix en Savoie, where he fell in love, with abundant results of the poetical kind. After Waterloo he returned to Paris and mixed a good deal in society. In 1818-19 he revisited Switzerland, Savoy, and Italy, the death of his beloved affording him new subjects for verse. He had now got together a considerable body of poetry, and after some difficulties he got his first book, the *Méditations*, published (1820). It was exceedingly popular and helped him to make a position. He had left the army for some time, and he now entered the diplomatic service and was appointed secretary to the embassy at Naples. On his way to his post he married at Geneva a young English lady, Marianne Birch, who had both money and beauty (1823), and in the same year his *Nouvelles Méditations* appeared. In 1824 he was transferred from Naples to Florence, where he remained for five years. His *Last Canto of Childe Harold* appeared in 1825, and he had to fight a duel with an Italian officer, Colonel Pepe, in consequence of a phrase in it. The *Harmonies Politiques et Religieuses* appeared in 1829 when he had left Florence. Having refused an appointment at Paris under the Polignac ministry (destined to be fatal to legitimism), he went on a special mission to Prince Leopold of Saxe-Coburg, who was not yet king of the Belgians, but was talked of as king of Greece. The next year he was elected to the Academy. Lamartine was in Switzerland, not in Paris, at the time of the Revolution of July, and though he put forth a pamphlet on *Rational Policy*, he did not take an active part in politics. In 1832 he set out with his wife and daughter for Palestine, having been unsuccessful in his candidature for a seat in the chamber. His daughter Julia died at Beyrout, and before long he received the news of his election by a constituency (Bergues) in the department of the Nord. He returned through Turkey and Germany and made his first speech shortly after the beginning of 1834. Thereafter he spoke constantly, and acquired considerable reputation as an orator—bringing out, moreover, many books in prose and verse. His Eastern travels (*Souvenirs d'Orient*) appeared in 1835, his *Jocelyn* in 1836, his *Chute d'un Ange* in 1838, and his *Recueillements*, the last remarkable volume of his poetry, in 1839. As the reign of Louis Philippe went on, Lamartine, who had previously been a liberal royalist, something after the fashion of Chateaubriand, became more and more democratic in his opinions. He set about his greatest prose work, the *Histoire des Girondins*, which at first appeared periodically, and was published as a whole in 1847. Like many other French histories it was a pamphlet as well as a chronicle, and the subjects of Lamartine's pen became his models in politics. At the revolution of February Lamartine at once became one of the most important personages in France. He was one of the first to declare for a provisional government, and became a member of it himself, with the post of minister for foreign affairs. He was elected for the new constituent assembly in ten different departments, and was chosen one of the five members of the Executive Committee. For a few months indeed Lamartine, who for nearly sixty years had been a distinguished man of letters, an official of inferior rank in diplomacy, and an eloquent but unpractical speaker in parliament, became one of the foremost men in Europe. His own inexperience in the routine work of government, the utterly unpractical nature of his colleagues and of the constitution which they endeavored to carry, and the turbulence of the Parisian mob proved fatal to his chances.

The quelling of the insurrection of May 15th was his last successful act. A month later the renewal of active disturbances brought on the fighting of June, and Lamartine's influence was extinguished in favor of Cavaignac. There is hardly another instance on record of so sudden an elevation and so rapid a fall. Before February in 1848 Lamartine was, as has been said, a private person of talent and reputation; after June in the same year he was once more the same, except that his chance of political preëminence was gone. He had been tried and found wanting, having neither the virtues nor the vices of his situation. In January, 1849, though he was nominated for the presidency, only a few thousand votes were given to him, and three months later he was not even elected to the legislative assembly.

The remaining story of Lamartine's life is somewhat melancholy. He had never been a rich man, nor had he been a saving one, and during his period of popularity and office he had incurred great expenses. He now set to work to repair his fortune by unremitting literary labor. He brought out in the *Presse* a series of *Confidences*, and somewhat later a kind of autobiography, entitled *Raphael*, which treated his own experiences in romantic fashion. He began and finished several historical works of more or less importance, the *History of the Revolution of 1848*, *The History of The Restoration*, *The History of Turkey*, *The History of Russia*, besides a very large number of small biographical and miscellaneous works. In 1858 a subscription was opened for his benefit. Two years afterward, following the example of Chateaubriand, he supervised an elaborate edition of his own works in forty-one volumes. This occupied five years, and while he was engaged on it his wife died (1863). He himself died March, 1869.

LA MARMORA, ALFONSO FERRERO, MARQUIS DE, Italian general and statesman, born at Turin, November 17, 1804, who, entering the army, became known as a zealous reformer. He was decorated for distinguished conduct in the national war of 1848, and promoted to general of brigade. In 1849 he entered the cabinet as Minister of War. In 1855 he withdrew from the ministry to assume the command of the Sardinian troops in the Crimea, and at the close of the war was invested with the Order of the Bath and the Grand Cross of the Legion of Honor, and re-entered the ministry in his former capacity. He took part in the war of 1859, by which Lombardy was acquired by Italy; and was appointed commander-in-chief of the Italian army in 1861, and in 1864 prime-minister. In the campaign against Austria in 1866 he lost the battle of Custozza, and had to sustain unpleasant controversy as to his management of the campaign. La Marmora died January 5, 1878

LAMB, CHARLES, the most original and delightful of English essayists and critics, and conspicuous alike for the beauty of his English and for the quiet humor of his writings, was a Londoner of the true Cockney order, and verily "to the manor born," having first seen the light of day in Crown Office Row, Inner Temple, London, February 10, 1775. His father, John Lamb, a Lincolnshire man, who filled the situation of clerk and companion to Mr. Salt, one of the benchers of the Inner Temple, was successful in obtaining for Charles, the youngest of three children, a presentation to Christ's Hospital, where the boy remained from his eighth to his fifteenth year (1782–1789). Here he was fortunate enough to have for a schoolfellow the afterward famous Samuel Taylor Coleridge, his senior by rather more than two years, and a close and tender lifelong friendship began which had a singularly great influence on the whole of his after career. For a short time he held a clerkship in the South Sea House under his elder brother John, and in 1792 he entered the accountant's office in the East India House, where during the next three and thirty years the hundred folios of what he used to call his true "works" were produced. A dreadful calamity soon came upon him, which seemed to blight all his prospects in the very morning of life. There was insanity in the family, which in his twenty-first year had led to his own confinement for some weeks in a lunatic asylum; and, a few months afterward, on September 22, 1796, his sister Mary, "worn down to a state of extreme nervous misery by attention to needlework by day and to her mother by night," was suddenly seized with acute mania, in which she stabbed her mother to the heart. The calm self-mastery and loving self-renunciation which Charles Lamb, by constitution excitable, nervous, and timid, displayed at this crisis in his own history and in that of those nearest him, will ever give him an imperishable claim to the reverence and affection of all who are capable of appreciating the heroisms of common life. His sister was, of course, immediately placed in confinement, and with the speedy return of comparative health came the knowledge of her fatal deed; himself calm and collected, he knew how to speak the words of soothing and comfort. With the help of friends he succeeded in obtaining her release from the lifelong restraint to which she would otherwise have been doomed, on the express condition that he himself should undertake the responsibility for her safe keeping. It proved no light charge; for, though no one was capable of affording a more intelligent or affectionate companionship than Mary Lamb during her long periods of health, there was ever present the apprehension of the recurrence of her malady; and, when from time to time the premonitory symptoms had become unmistakable, there was no alternative but her removal, which took place in quietness and tears. How deeply the whole course of Lamb's domestic life must have been affected by his singular loyalty as a brother need not be pointed out; for one thing, it rendered impossible his union with Alice Winterton, whom he appears to have truly loved, and to whom such touching reference was made long afterward in *Dream Children, a Reverie*.

Lamb's first appearance as an author was made in the year of the great tragedy of his life (1796), when there were published in the volume of *Poems on Various Subjects* by Coleridge four sonnets by "Mr. Charles Lamb, of the India House." In the following year he also contributed, along with Charles Lloyd, some pieces in blank verse to Coleridge's new volume of *Poems*. In 1798 he published a short and pathetic prose tale entitled *Rosamund Gray*, and in 1799 he was associated with Coleridge and Southey in the publication of the *Annual Anthology*, to which he had contributed a short religious poem in blank verse, entitled "Living without God in the World;" the company in which he was thus found bringing upon him the irrelevant and pointless ridicule of Canning and Gillray. In 1807 appeared *Tales Founded on the Plays of Shakespeare*, written by Charles and Mary Lamb, and in 1808, *Specimens of English Dramatic Poets who lived about the time of Shakespeare*, with short but felicitous critical notes. In the same year, Mary Lamb, assisted by her brother, also published *Poetry for Children*, and a collection of short school-girl tales under the title *Mrs. Leicester's School;* and to the same date belongs the *Adventures of Ulysses*, designed by Lamb as a companion to the *Adventures of Telemachus*. In 1810 began to appear Leigh Hunt's quarterly periodical, *The Reflector*, in which Lamb published much (including the essays on the tragedies of Shakespeare and on Hogarth) that subsequently appeared in the first collective edition of his *Works*, which appeared in 1818. The establishment of the *London Magazine*, in 1820, stimulated him to the production of a series of new essays, which rose into instant popularity, and may be said to form the chief cornerstone in the small but classic temple of his fame. The first of these, as it fell out, was a description of the old South Sea House, with which Lamb happened to have associated the name of a "gay, light-hearted foreigner" called Elia, who had frequented it in the days of his service there. The pseudonym adopted on this occasion was retained for the subsequent contributions which appeared collectively in a post 8vo volume of *Essays* in 1823. After a brief career of five years, the *London Magazine* came to an end, and about the same period Lamb's long connection with the India House terminated, a pension of about £450 having been assigned to him. The malady of his sister, which continued to increase with ever-shortening intervals of relief, broke in painfully on his lettered ease and comfort, and it is unfortunately impossible to ignore the deteriorating effects of an over-free indulgence in the use of tobacco and alcohol on a temperament such as his. His removal, on account of his sister, to the quiet of the country, by tending to withdraw him from the stimulating society of the large circle of literary friends who had helped to make his Wednesday evening "at homes" so remarkable, doubtless also tended to intensify his listlessness and helplessness. One of the brightest elements in the closing years of his life was the friendship and companionship of Emma Isola, whom he and his sister had adopted, and whose marriage in 1833 to Mr. Moxon, though a source of unselfish joy to Lamb, left him more than ever alone. While livng at Edmonton, he was overtaken by an attack of erysipelas, brought on by an accidental fall as he was walking on the London road; after a few days' illness, he painlessly passed away, on December 27, 1834.

LAMBALLE, MARIE THÉRÈSE LOUISE DE SAVOIE-CARIGNAN, PRINCESSE DE, daughter of Louis Victor of Carignan, was born at Turin, September 8, 1749. In 1767 she was married to Stanislaus, prince of Lamballe, and son of the duke of Penthièvre. After his death in the following year an unsuccessful attempt was made to arrange a marriage between her and Louis XV. She then retired from the court; but, having accidentally made the acquaintance of Marie-Antoinette, she was, after the accession of Louis XVI., appointed by the queen superintendent of the royal household, and enjoyed her closest intimacy and friendship. In 1792 she shared for a week her imprisonment in the Temple, but on August 19th she was transferred to La Force, and, having refused the oath against the monarchy, she was on September 3d delivered over to the fury of the populace, after which her head was placed on a pike and carried before the windows of the imprisoned queen.

LAMBERT, JOHANN HEINRICH, mathematician, born at Mulhausen, Alsace, in 1728; died in 1777.

LAMBERT, JOHN, was born in 1619 at Calton Hall, in the parish of Kirkby Malham, in the West Riding of Yorkshire. His family was of ancient lineage, and long settled in the county. He studied at the Inns of Court, but without making law his profession. In 1640 he married Frances, daughter of Sir William Lister. He was present at the great meeting of the Yorkshire gentry on Heyworth Moor (June 3, 1642), and in September was appointed a captain of horse under Lieutenant-Colonel Fairfax. He did good service at the siege of Hull (October 11, 1642), at Bradford (March 5, 1644), and the important engagement at Selby (April 10, 1644). At Marston Moor (July 2, 1644) he commanded part of Sir Thomas Fairfax's cavalry on the right wing. He was sent into York to arrange terms for the surrender of the city, which took place July 16, 1644. When the "New Model" army was formed in the beginning of 1645, Colonel Lambert was appointed commissary-general of the army in the north. He beat the royalists at Keighley and Ferrybridge, and took several strong places. He followed Fairfax's campaign in the west of England in 1646, and was a commissioner with Cromwell and others for the surrender of Oxford in the same year.

When the quarrel between the army and the parliament began, Lambert threw himself warmly into the army's cause. In August, 1647, Lambert was sent as major-general by Fairfax to take charge of the forces in the northern counties.

When the Scotch army under the marquis of Hamilton invaded England in the summer of 1648, Lambert was obliged to retreat till Cromwell came up from Wales, and joining him destroyed the Scotch army in three days' fighting from Preston to Warrington. Lambert pressed Hamilton with the cavalry, and took him prisoner at Uttoxeter, a few days after the battle. He then marched back into Scotland, where he was left in charge of the troops. In December, 1648, he sat down before Pontefract Castle, which held out till March, 1649. Lambert was thus absent from London at the time of the violence put upon the parliament by Colonel Pride, and the other measures which led to the king's death.

Cromwell, when appointed to the command of the war in Scotland (July 26, 1650), took Lambert with him as major-general. He was wounded at Musselburgh, but was with Cromwell at Dunbar on September 2d, when the soldiers begged that Lambert might lead them the next day, and Cromwell willingly gave his consent. He defeated the "Protesters" or "Western Whigs" at Hamilton, December 1, 1650. In the following July he was sent over into Fife to get a position in the rear and flank of the Scotch army near Falkirk, and force them to decisive action by cutting off their supplies from Perth. A battle fought at Inverkeithing, with heavy loss to the Scots, in which Lambert behaved with great gallantry, gave him the position he required, and he improved it by taking Inchgarvie and Burntisland. Charles (as Lambert had foreseen) made for England. Lambert with the cavalry was ordered to harass his march down the western shires, while Cromwell followed through Yorkshire and the Midlands. In the action at Warrington Bridge Lambert again distinguished himself by his personal courage, and at Worcester also (September 3, 1651), where he commanded the forces on the eastern bank of the Severn, and had his horse shot under him. Parliament conferred on him a grant of lands in Scotland worth £1,000 per annum.

In November, 1651, he was made a commissioner to settle the affairs of Scotland, and on the death of Ireton he was appointed lord deputy of Ireland in February, 1652. He accepted the office with pleasure; but his magnificent preparations offended the Commons, who limited his office to the term of six months. Lambert hereupon resigned the deputyship without entering on its duties.

Notwithstanding this affront Lambert took part with Cromwell in the expulsion of the Rump (April 20, 1653) and its council of state. He was joined to the lord-general and two others as additional members of the little parliament of nominees, making up the number to one hundred and forty-four. He presented the act of resignation of that assembly, and was principally concerned in drawing up the address requesting Cromwell to assume the protectorate, and the instrument of government, which was the constitution of the Protectoral rule. At the installation of Cromwell he bore a prominent part. In the parliament of 1654, and again 1656, Lambert (or Lord Lambert, as he is now generally called) sat as member for the West Riding of Yorkshire. When the proposal to declare Oliver king was started in parliament (February, 1657) he at once declared strongly against it. A hundred officers headed by Fleetwood and Lambert waited on the Protector, and begged him to put a stop to the proceedings. Lambert was not convinced by Cromwell's arguments, and Cromwell and he henceforward never spoke to each other as friends. On his refusal to take the official oath of allegiance to the Protector, Cromwell deprived him of his commissions, giving him, however, a pension of £2,000 a year. He retired to his house and garden at Wimbledon, and appeared no more in public during Oliver Cromwell's lifetime.

On the accession of Richard he seems to have expected the first place in the army, but was not unwilling to be second to Fleetwood. The Protector was between two parties—the court party; who wished to hold to the "Petition and Advice," and the army party or Wallingford House party, who, while supporting Richard as Protector, wished to put the control of the army into stronger hands. Richard saw that to deliver up the power of the sword was to abdicate, and refused to make Fleetwood general. Lambert was elected for Pontefract in Richard's parliament, and took part with the republican malcontents who soon combined with Wallingford House. Councils of officers were held, which Lambert, though holding no commission, was invited to attend. They determined to stand by the "good old cause" and to demand the dissolution of the parliament as being too full of monarchical and Presbyterian notions—in fact, to put the civil power aside and set up a military government in its stead. The Protector dissolved parliament (April 22, 1659). The officers, unable to rule without a parliament, restored the Rump as representing the Commonwealth (May 7, 1659). Richard's protectorate had practically ended with his parliament, and he now laid down the show of royalty. Sir George Booth and Sir Thomas Middleton headed a royalist rising in Cheshire, which Lambert put down after a sharp encounter near Chester. He promoted a petition from his army that Fleetwood might be made lord-general and himself major-general. The republican party in the house took offense. The Commons (October 12, 1659) cashiered Lambert, Desborough, and other officers, and retained Fleetwood's commission as chief of a military council of seven republicans of the old sort. Lenthall, the speaker, was to give his orders to the army. On the next day (October 13th) Lambert caused the doors of the House to be shut and the members kept out. On the 26th a "committee of safety" was appointed, of which Lambert was a member. He was also appointed major-general of all the forces in England and Scotland, Fleetwood being general. Lambert was now sent with a large force to meet Monk, who was in command of the English forces in Scotland, and either negotiate with him or force him to terms. Monk, however, declared for the liberty and authority of parliament, and set his army in motion southward. The committee of safety was obeyed no more than the Rump had been. The soldiers themselves cried out for the restoration of parliament, and on December 26th the Rump was recalled to restore some appearance of lawful authority.

Meanwhile the bulk of Lambert's army was dissolved by the mere appearance of Lord Fairfax in arms on Marston Moor, and he was kept in suspense by Monk's deceits and delays, till his whole army fell from him, and he came back to town almost alone. Monk marched unopposed to London, and declared for a "free parliament." The "excluded" Presbyterian members were recalled. Lambert was sent to the Tower (March 3, 1660), from which he escaped a month later (April 9, 1660). He tried to rekindle the civil war in favor of the Commonwealth, but was speedily recaptured, and sent back to the Tower (April 24th). On the Restoration he, along with Vane, was exempted from danger of life by an address of both Houses to the king. The next parliament (1662) brought a charge of high treason against them. Vane was beheaded, but Lambert was spared, and remained in custody in the island of Guernsey for the remainder of his life. He died at the age of seventy-five, in 1694.

LAMBÈSE, or LAMBESSA, the ancient *Lambæsa* and the *Tazzui* or *Tezzulet* of the natives, is situated in the French province of Constantine in Algeria, about six miles east of Batna. The modern village is well known for its great convict establishment (founded about 1850); and the remains of the Roman town, and more especially of the Roman camp, in spite of the wanton vandalism to which they have been more than once subjected since their discovery, are among the most interesting in northern Africa. The ruins of the town are situated on the lower terraces of the Jebel Aures, and consist of triumphal arches, temples, aqueducts, and an immense quantity of ordinary masonry evidently belonging to private houses. To the north and east lie extensive cemeteries with the stones still standing in their original alignments; to the west is a similar area from which, however, the stones have been largely removed for building the modern village. Of the temples the most noteworthy are those to Æsculapius and Health (Salus), and to Isis and Serapis.

LAMBETH. See LONDON.

LAMECH is a name which appears in each of the antediluvian genealogies, Gen. iv. 16–24, and Gen. v. In the first he is a descendant of Cain, and, through his three sons, father of the several vocations of early civilization; in the latter he is father of Noah. In each case, though in different senses, he marks the close of the first epoch of the world's history.

The savage "sword song" of Lamech is unique in the Bible, and breathes the true spirit of the desert:—

> Adah and Zillah, hear my voice.
> Ye wives of Lamech, give ear unto my speech.
> I slay a man for a wound,
> A young man for a stroke;
> For Cain's vengeance is sevenfold,
> But Lamech's seventy-fold and seven.

LAMEGO, a town in the district of Vizeu, in the province of Beira, Portugal, is situated six miles south of the Douro, and about fifty miles east of Oporto. Population (1900), about 9,500.

LAMENNAIS, HUGUES FÉLICITÉ ROBERT DE, French theologian, philosopher, and political writer, was born at St. Malo in Brittany. His *Reflexions on the State of the Church during the Eighteenth Century and on the Actual Situation*, published anonymously at Paris, was the first important theological stand made against the materialistic philosophy which had its apotheosis in imperialism. Napoleon's police seized the book as dangerously ideological, with its eager recommendation of religious revival and active clerical organization. It awoke the ultramontane spirit which has played so great a part since in the politics of churches and states. In 1811 he took the tonsure, but shortly after became teacher of mathematics in the seminary founded by his brother at St. Malo. Theological politics had large discussion after the concordat of 1802, by which the Gallican Church was reëstablished; and the brothers' joint work, *Tradition upon the Institution of Bishops*, which was published a few days after the restoration, condemns the Gallican principle which allowed bishops to be created irrespective of the pope's sanction.

The revival of the Bourbon monarchy drew Lamennais to Paris, and the Hundred Days sent him to exile. The abbé Caron gave him work in his school for French exiles in London; and he also became tutor at the house of Lady Jerningham, whose first impression of him as an imbecile changed into friendship. In 1815 he returned with the abbé to Paris. He enjoyed much peace at the Maison des Feuillantes, and finished there the first volume of his great work, the *Essay on Indifference in the Matter of Religion*. Published in 1817, it affected Europe like a spell. Since Bossuet no clergyman wielded such power as he gained at a blow. He denounced toleration, and advocated a Catholic restoration to belief. Ecclesiastical authority, founded on the absolute revelation delivered to the Jewish people, but supported by the universal tradition of all nations, he proclaimed to be the sole hope of regenerating the European communities. In 1824 the fourth volume completed the work, and the *Defence* of the same date indicates the violent opposition he met with, not only from his natural enemies, the lovers of personal freedom in thought, science, and politics, sacred or civil, but from the Gallican bishops and monarchists, because he argued that all authority rests in the Holy See, and from his ultramontane friends, because he dared to support the Christian revelation by an analysis of human or, as they considered, profane tradition.

Meanwhile Lamennais had become journalist on the *Conservateur*, with Chateaubriand, De Bonald, and De Villèle for his fellows in essentially political work. He went to Rome in 1824, and Pope Leo XII., his admirer, offered him a cardinal's hat, which he refused. On his return he published *Religion in its Relations to Civil and Political Order*, the first volume of which was a picture of the religious state of France, and the second an attack on the competence of the assembly of the clergy in 1682 to decree the liberties of the Gallican Church. The law accepting these liberties, Lamennais was summoned before the state courts, and with all France keenly interested was condemned to pay a fine. From this time he broke with the legitimists and the liberals, and Rome became to him the only seat of the social problem. His ideal was a pure theocracy.

But in the *Progress of the Revolution and War against the Church* the element of popular political liberty began to appear, modifying such infallibility of the head of the church as deposing of princes and dispensing with oaths of allegiance taken by their subjects implied. The revolution of 1830 increased his popular leanings, and in the journal *L'Avenir*, which he founded in September with the mottoes "God and Liberty," "The Pope and the People," theories strange to ultramontanism were broached. With Lacordaire, Montalembert, Gerbet, and other disciples, he demanded rights of local administration, enlarged suffrage, universal and equal freedom of conscience, of instruction, of meeting, and of the press. Methods of worship were to be criticised, improved, or abolished, and all in absolute submission to papal spiritual but not temporal authority. The Jesuits and the prelates grew alarmed, and "the modern Savonarola" was denounced to Gregory XVI. On their spiritual obedience the writers of *L'Avenir* were ordered to suspend the journal, which they did (1831), and Lamennais, Lacordaire, and Montalembert set out for Rome to get the papal pardon and blessing, which was not accorded. His genius had turned the entire Christian church against him, and those whom he fought for so long, the ultramontanes, were the fiercest of all his opponents. The famous *Words of a Believer* appeared in 1834, and his final rupture with the church took place. "Small in size but immense in its perversity," was the pope's criticism in a new encyclical letter. A tractate of aphorisms, it has the vigor and sacred breathing of a Hebrew prophet.

The *Affairs of Rome and the Ills of the Church and Society* came from old habit of religious discussions rather than from his real mind of 1837, or at most it was but a last word. *Modern Slavery*, *the Book of the People*, *Politics for the People*, two volumes of articles from the journal of the extreme democracy, *Le Monde*, are titles of works which show that he has arrived among the missionaries of liberty, equality, and fraternity, and he soon gets a share of their martyrdom. *The Country and the Government* caused him a year's imprisonment in Ste. Pélagie. He struggled through difficulties of lost friendships, limited means, and personal illnesses, faithful to the last to his hardly won dogma of the sovereignty of the people, and, to judge by his contribution to Louis Blanc's *Review of Political Progress*, was ready for something like communism. He was named president of the "Société de la Solidarité republicaine," which counted half a million adherents in fifteen days. The Revolution of 1848 had his sympathies, and he started *Le Peuple Constituant*, but was compelled to stop it on July 10th, complaining that silence was for the poor; but again he was at the head of *La Révolution Democratique et Sociale*, which also succumbed. He managed his own publications; and pamphlets without number, and at intervals volumes of *Mélanges*, kept his influence fresh and his republican aims to the front as much as possible. In the constituent assembly he sat on the left till the *coup d'état* of Napoleon III. in 1851 put an end to all hopes of popular freedom. While deputy he drew up a constitution, but it was rejected as too radical. A translation of Dante chiefly occupied him till his death in the fourth year of the second empire. He refused to be reconciled to the church, and was buried at Pere La Chaise without funeral rites, according to his own directions, mourned for by a countless concourse of democratic and other admirers.

LAMENTATIONS, Book of. The Old Testament book of Lamentations bears in Hebrew Bibles the superscription, "Ah how!" the opening word of the first chapter, and also of chaps. ii. and iv. The Talmud, however, and Jewish writers in general call it the book of "elegies" or "dirges," of which the Septuagint title, "Tears," and the Latin *Lamentationes* or *Lamenta* are translations.

According to a tradition which passed unquestioned among Jews and Christians till recent times, the author of the whole book is the prophet Jeremiah.

LAMETTRIE, Julien Offray de, one of the creators of the French illumination, and the earliest exponent of that system of materialism which was afterward elaborated by Holbach and Cabanis, was born at St. Malo on December 25, 1709. He died in 1751, when his position as a philosopher was publicly recognized in an address written by the king himself, and read before the Berlin Academy.

LAMIA was a female demon, whose name was used by Greek mothers to frighten their children; from the Greek she passed into Roman demonology. She was also known as a sort of fiend, the prototype of the modern vampire, who in the form of a beautiful woman enticed young men to her embraces, in order that she might feed on their life and heart's blood. In this form the tale has been used by Goethe as the subject of one of his most powerful poems, *Die Braut von Corinth*.

LÄMMERGEYER (*i.e.*, Lamb-Vulture), or Bearded Vulture, the *Falco barbatus* of Linnæus and the *Gypaetus barbatus* of modern ornithologists, one of the grandest birds of prey of the Palæarctic Region—inhabiting lofty mountain chains from Portugal to the borders of China, though, within historic times, if not within living memory, it has been exterminated in several of its ancient haunts. Its northern range in Europe does not seem to have extended further than the southern frontier of Bavaria or the neighborhood of Salzburg; but in Asia it formerly reached a higher latitude, having been found, even so lately as 1830, in Dauuria. It is not uncommon on many parts of the Himalayas, where it breeds, and on the mountains of Kumaon and the Punjab, and is the "Golden Eagle" of most Anglo-Indians. Returning westward, it is found also in Persia, Palestine, Crete and Greece, the Italian Alps, Sicily, Sardinia, and Mauritania. The whole length of the bird is from forty-three to forty-six inches, of which, however, about twenty are due to the long cuneiform tail, while the pointed wings measure more than thirty inches from the carpal joint to the tip. The coloration of the plumage is very peculiar: the top of the head is white, bounded by black, which, beginning in stiff, bristly feathers turned forward over the base of the beak, proceeds on either side of the face in a well-defined band to the eye, where it bifurcates into two narrow stripes, of which the upper one passes above and beyond that feature till just in front of the scalp it suddenly turns upward across the head, and meets the corresponding stripe from the opposite side, inclosing the white forehead already mentioned, while the lower stripe extends beneath the eye about as far backward, and then suddenly stops. A tuft of black, bristly feathers projects beardlike from the base of the mandible, and gives the bird one of its commonest epithets in many languages, as well as an appearance almost unique among the whole Class *Aves*. The rest of the head, neck, throat, and lower parts generally are clothed with lancelot feathers of a pale, tawny color—sometimes so pale as to be nearly white beneath; while the scapulars, back, and wing coverts generally are of a glossy grayish-black, most of the feathers having a white shaft and a median tawny line. The quill-feathers, both of the wings and tail, are of a dark blackish-gray. The irides are of a light orange, and the sclerotic tunics—equivalent to the "white of the eye" in most animals—which in few birds are visible, are in this very conspicuous and of a deep crimson, giving it an air of great ferocity. In the young of the year the whole head, neck, and throat are clothed in dull black, and most of the feathers of the mantle and wing-coverts are broadly tipped and mesially streaked with tawny or lightish gray.

The Lämmergeyer breeds early in the year. The nest is of large size, built of sticks, lined with soft material, and placed on a ledge of rock—a spot being chosen, and often occupied for many years, which is nearly always difficult of access, and not infrequently quite inaccessible, to man, from the precipitous or overhanging configuration of the cliffs. Here in the month of February a single egg is usually laid. This is more than three inches in length by nearly two and one-half in breadth, of a pale but lively brownish-orange.

There is much discrepancy as to the ordinary food of the Lämmergeyer, some observers maintaining that it lives almost entirely on carrion, offal, and the most disgusting garbage; but there is no question of its frequently taking living prey, and it is reasonable to suppose that this bird, like so many others, is not everywhere uniform in its habits. Its very name shows it to be the reputed enemy of shepherds, and it is in some measure owing to their hostility that it has been exterminated in so many parts of its European range.

LAMONT, Johann von, was born at Braemar, Aberdeenshire, on December 13, 1805. He was sent at the age of twelve to be educated at the Scottish monastery in Ratisbon, and apparently never afterward returned to his native country—so that he became, to all intents and purposes, a German. After passing through the gymnasium and lyceum, he devoted himself to theology; but his strong bent for scientific studies was recognized by the head of the monastery, P. Deasson, and on his recommendation he was admitted to the then new observatory of Bogenhausen (near Munich), where he worked under Soldener, latterly as his assistant. After the death of his chief, in 1835, he was, on Schumacher's recommendation (Steinheil, supported by Bessel, also competing for the office), appointed to succeed him as conservator of the observatory. In 1852 he became professor of astronomy at the university of Munich. He held both these posts till his death, which took place on August 6, 1879.

LA MOTTE FOUQUÉ. See Fouqué.

LAMP. Technically, a lamp is an apparatus in which to burn fluid combustible substances. Lamps are mostly intended for yielding light; but there are also special forms the purpose of which is to afford highly concentrated heat in a convenient and portable form. The substances used in lamps for lighting are of two classes—(1), fixed oils, and (2), fluid hydrocarbons, obtained from the distillation of bituminous shales, etc. (paraffin oil), petroleum, and essential oils. The latter class may be distinguished as mineral oils. Till very recently fixed oils were almost exclusively used for lamps; but, since the introduction of the cheaper and more convenient mineral oils, in the second half of the nineteenth century, the use of fixed oils has steadily decreased in all parts of the world.

There is scarcely any fixed or fatty oil which has not been used, more or less, for burning. Many oils are so used in the districts which produce them, although they hardly enter into ordinary commerce under the name of burning oils. The so-called fish oils (sperm, whale, and seal) were, in recent times, principal burning oils, and, to a limited extent, are still so employed. Of the vegetable oils of commerce, colza oil is the most extensively used as an illuminant, and after it come other rape oils, poppy oil, the lower qualities of olive oil, sesamum or gingelly oil, candle-nut oil, and groundnut oil, all of which, however, are local or restricted in consumption. The suitability of fixed oils for burning purposes depends on their purity or freedom from foreign matters, and on their limpidity, or, what is in effect the same thing, the temperature at which they solidify. Thus cocoanut fat is consumed in ordinary lamps in tropical regions, although in temperate latitudes it is a permanent solid. In the combustion of a fixed oil in lamps, the oil undergoes destructive distillation, and at the burning point is resolved into a gaseous mixture. The comparative viscosity of all fixed oils renders it necessary to adopt some device supplementary to the capillary action of the wick for maintaining at the level of the burner a supply of oil sufficient to support uniform combustion. Again, the lubricant properties of fixed oils make it practicable to adopt various mechanical devices to regulate the supply of fuel to the burner, and otherwise control illumination.

The mineral oils, on the other hand, are, as sold, mixtures of various volatile hydrocarbons which give off inflammable vapors at comparatively low temperatures, and in consumption in lamps they come to the burning point in the condition of vapor. With highly volatile oils, and the use of imperfectly fitted lamps, though not with proper oil and fittings, there is some danger of explosion; there is also a risk that with imperfect combustion deleterious gases may be diffused through an apartment. Mineral oils possess such a high degree of limpidity that the suction of the wick alone is generally sufficient to bring the necessary supply of fuel to the burner.

The qualities of a lamp are judged of by the brilliance, steadiness, and uniformity of light it yields in proportion to the quantity of oil it consumes; by the convenient position of the light in relation to the equal illumination of the space it has to light; by the form, portability, and convenience of the lamp itself; and by the simplicity and economy of its construction, regard being had to efficiency. The chief points to consider in connection with the structure of lamps are (1) the means of supplying oil to the burner and of regulating that supply, (2) the form and arrangement of the wick or medium over which the flame is supported, (3) the regulation and control of the currents of air in the lamp which support combustion, and (4) the position of the oil reservoir in relation to the dissemination of the light and the stability of the lamp itself.

The simple form which was used down to the end of the eighteenth century, and which as a "cruisie" continued in common use in Scotland till the middle of this century, illustrates the most elementary and most imperfect arrangement of a lamp. Here, as in the lamps of antiquity, the oil vessel lies immediately behind the burning point of the wick, with which the oil is about level when the reservoir is full. The wick is a round, soft cord or fibrous mass. Such a lamp has no merit but simplicity. The light is thrown only forward and to the sides, the back being entirely in shadow. The wick, being a round, solid mass, takes up oil equally at the center and circumference; but to the outer edges of the flame only is there any access of air; consequently combustion in the center is imperfect, resulting in a smoky, unsteady flame, and a discharge into the atmosphere of the acrid products of destructive distillation. Further, as the level of the oil sinks in the reservoir, the wick has to feed the flame from a greater distance by mere capillary force, and, the supply thus diminishing, the light decreases in proportion.

Since the time when inventors first began to better the primitive lamp, just one hundred years ago, the improvements in lamp construction have been enormous: the forms and modifications of invention bearing on lamps have been innumerable, and many excellent devices which did good service have been superseded by others simpler and more efficient.

The first improvement was in wicks and burners. In 1783 Leger of Paris devised a flat band or ribbon wick and burner, which produced a broad, thin flame with no core, so that all parts of the oil supply were brought into intimate contact with the air, and perfect combustion and a steady flame were secured. The deficiencies of the flat wick flame were that the light was comparatively thin and impoverished, and that the parts of a room facing the thin ends of the flame were badly illuminated. To some extent these evils were overcome by the adoption of a curved form of burner, which in the end led up to the burner invented by Ami Argand of Paris, and patented in England in 1784. In its simplest form the Argand burner consists of two concentric tubes or cylinders, between which the tubular wick is contained. The inner tube is open throughout, and to it a current of air passes from below, and, being carried upward by the draught of the flame, atmospheric oxygen for combustion is supplied as well to the inner circumference as to the outer side of the flame, whence the name "double current burner" which it frequently receives. An adequate and controllable flow of air to the interior of the Argand burner having been secured, it remained to devise some means by which the current supplied to the outer circumference of the flame could be strengthened and regulated. This Argand secured by means of a chimney, which was made at first of sheet iron and suspended over the flame; but that device was quickly abandoned in favor of a glass chimney which rested on a perforated gallery placed a little below the level of the burner. Subsequent experience suggested the formation of a shoulder or constriction on the chimney at a point a little above the level of the flame, whereby the air current is directed inward against the external surface of the flame, thus materially improving the combustion. Argand's original burner is the parent form of innumerable modifications all more or less complex in their adaptations.

Lamps for Mineral Oils.—At an early period numerous attempts were made to utilize the highly inflammable volatile hydrocarbons and alcohols, which from their cheapness and abundance offered some hope of competing with the fixed oils then in universal use for illuminating purposes. These lamps had little success, and no small danger accompanied their limited use. The Vesta lamp of Young, introduced in 1834 for burning spirit of turpentine under the name of camphene, procured a smokeless flame by means of the Argand burner, constricted chimney, and Liverpool button, with the access of abundant air. It was not, however, till the introduction of paraffin oils and petroleum that mineral oil lamps became of great importance. Lamp-makers had not to direct their attention to mechanical arrangements, for mineral oils rise abundantly by capillarity alone; the problem was to produce a sufficiently powerful current of air to insure complete and smokeless combustion of these richly carbonaceous compounds, and, in view of the highly volatile nature of the liquids dealt with, to prevent their exposure to the air, and more particularly to prevent the heating of the oil reservoir which would generate explosive mixtures, or vapors of dangerous tension.

Mineral oil lamps, like those for fixed oils, are constructed with both circular or tubular and flat wick burners. In the case of the latter a cone or brass cap is placed over the burner, having a slit or opening a little longer and wider than the wick-holder itself. This cone serves to direct the whole current of air which enters below against the surface of the flame, and mingling with the vapor of the oil produces perfect combustion, with a white flame which rises over the slit in the cone. The cool air current entering under the cone is also beneficially utilized in preventing the undue heating of the oil reservoir and the metallic wick-holder which passes down into it.

These flat-wick lamps are simple in construction, cheap, and, so far as they go, economical light producers, but their flame is thin, and it is not practicable to compensate for the thinness by increased breadth of wick, because in such a case the edges of the light come so near the chimney that at these points the glass becomes rapidly heated, causing unequal expansion and destruction of the chimney.

Ancient Lamps.—Though Athenæus states (xv. 700) that the lamp was not an ancient invention in Greece, it had come into general use there for domestic purposes by the fourth century B.C., and no doubt had long before been employed for temples or other places where a permanent light was required, in room of the torch of Homeric times. Herodotus (ii. 62) sees nothing strange in the "festival of lamps," Lychnokaie, which was held at Sais in Egypt, except in the vast number of them. Each was filled with oil so as to burn the whole night. Again he speaks of evening as the time of lamps. Still, the scarcity of lamps in a style anything like that of an early period, compared with the immense number of them from the late Greek and Roman age, seems to justify the remark of Athenæus. The commonest sort of domestic lamps were of terra-cotta, with a spout or nozzle in which the wick burned, a round hole on the top to pour in oil by, and a handle to carry the lamp with.

LAMPBLACK is a deep black pigment consisting of carbon in a very fine state of division, obtained by the imperfect combustion of highly carbonaceous substances, which, producing a smoky flame, forms a deposit of soot or lampblack. It is manufactured from scraps of resin and pitch refuse and inferior oils and fats, and other similar combustible bodies rich in carbon.

LAMPEDUSA, a small island in the Mediterranean, about ninety miles east of Mahadia in Tunis, and 100 miles west of Malta. Situated on the edge of the submarine platform which extends along the eastern coast of Tunis, it must be considered as attaching itself physically to the African continent, but politically it belongs to the kingdom of Italy, and forms part of the commune of Licata, in Sicily.

LAMPREY, a fish belonging to the family *Petromyzontidæ* (literally, stone-suckers), which with the hag-fishes or *Myxinidæ* forms a distinct subclass of fishes, the *Cyclostomata*, distinguished by the low organization of their skeleton, which is cartilaginous, without vertebral segmentation, without ribs or real jaws, and without limbs. The lampreys are readily recognized by their long, eel-like, scaleless body, terminating anteriorly in the circular, suctorial mouth which is characteristic of the whole subclass. Lampreys, especially the sea-lamprey, are esteemed as food, and were formerly even more so than at present; but their flesh is not easy of digestion. Henry I. is said to have fallen a victim to this, his favorite dish. The species of greatest use is the river-lamprey, which as bait is preferred to all others in the cod and turbot fisheries of the North Sea. Yarrell states that formerly the Thames alone supplied from 1,000,000 to 1,200,000 lamperns annually but their number has so much fallen off that, for instance, in 1876 only 40,000 were sold to the cod-fishers.

LAMPRIDIUS, ÆLIUS. See AUGUSTAN HISTORY.

LAMPSACUS, an ancient Greek colony in Mysia, Asia Minor, known as Pityusa or Pityussa before its colonization by Ionian Greeks from Phocæa and Miletus, was situated on the Hellespont, opposite Callipolis in Thrace. It possessed a good harbor; and the neighborhood was famous for its wine, so that, having fallen into the hands of the Persians during the Ionian revolt, it was assigned by their king to Themistocles to provide him with wine, as Percote did with meat, and Magnesia with bread. After the battle of Mycale (479), B.C.), Lampsacus joined the Athenians, but, having revolted from them soon afterward, had to be reduced by force. In the Roman wars against Antiochus of Syria, its inhabitants were received as allies of Rome. Lampsacus was the chief seat of the worship of Priapus; and it is related that Alexander the Great was with difficulty restrained from destroying the city on account of the immorality fostered by the obscene rites of that god. The modern Lamsaki is probably not on the site of Lampsacus, but must be near it.

LANARK, an inland county of Scotland, is bounded north by Dumbarton and Stirling, east by Stirling, Linlithgow, Midlothian and Peebles, south by Dumfries, and west by Ayr, Renfrew and Dumbarton. Its greatest length, northwest to southeast, is over fifty miles, and its greatest breadth, from east to west, over thirty miles. The total area comprises 568,868 acres, or 888 square miles. Though only the twelfth as regards extent, it stands far above all the other Scottish counties in point of population, having 1,339,289 inhabitants in 1901, or only 18,909 less than the aggregate of the three counties that rank next to it.

LANARK, a royal and parliamentary burgh, the chief town of the above county, is situated on a slight eminence near the Clyde, thirty-two miles southwest of Edinburgh, and twenty-five southeast of Glasgow. Population, 5,000.

LANCASHIRE, or COUNTY OF LANCASTER, a maritime county in the northwest of England. A detached portion in the north, known as Furness, is situated between Cumberland and Westmoreland. The remainder of the county, separated from Furness by Morecambe Bay, is bounded north by Westmoreland, east by Yorkshire, south by Cheshire, and west by the Irish Sea, which forms also the southern boundary of Furness. The outline of the county is irregular. Its greatest length is seventy-six miles; south of the Ribble the average breadth is about forty miles, while to the north it is only about ten miles. The total area is 1,207,926 acres, or 1,887 square miles. With the exception of a narrow tract of country along the south coast, the Furness division consists of hilly moorlands, a continuation of the Cumberland mountains, intersected by deep valleys. Lancashire is the principal seat of the cotton manufacture, not only in England, but in the world. The history of the industry in the county, and statistical details regarding it, will be found in the article COTTON. The total number of factories is close on 2,000, and the number of persons employed in these is nearly 370,000. The center of the industry is Manchester and the neighboring towns, especially Oldham. Previous to the American war it employed nearly 100,000 more persons than at present. The woolen, silk, and linen manufactures employ about 50,000 persons. There are a great variety of industries dependent on these staple manufactures, such as bobbin-making, the preparation of dyes, calico-printing, and the manufacture of machinery and of steam engines. Barrow-in-Furness is noted for the manufacture of iron and steel. Warrington has a large trade in sole-leather. St. Helens is celebrated for its crown, sheet, and plate glass, and Prescot for its watches. Chemicals are largely manufactured in several towns. The principal seaports are Liverpool, Barrow, Ulverstone, Lancaster, Fleetwood, and Preston, to the separate articles on which the reader is referred for particulars regarding shipping, trade, and ship-building. The principal watering-places are Blackpool, Lytham, Morecambe, and Southport.

The population in 1890 was more than six times as great as in 1801. In that year it was 673,486, or only a little more than the population of Liverpool at the present time. The present population (1902) is 1,827,390.

LANCASTER, a municipal borough and seaport town, the capital of Lancashire, England, is situated on the left bank of the river Lune, about seven miles from its mouth, and on the London and Northwestern Railway, fifty-two miles northwest of Manchester. Population (1901), about 30,000.

LANCASTER, the county seat of Lancaster county, Penn., is situated on the Conestoga river, sixty-eight miles west of Philadelphia. It was founded in 1730 and incorporated as a borough in 1742, was the State capital from 1799 to 1812, and in 1812 became a city. It is laid out on the rectangular plan, and is unusually well built. The city is the seat of numerous charitable and educational institutions. Among the latter is Franklin and Marshall College, the chief educational establishment of the Reformed Church, which also maintains a theological seminary in connection with it. The courthouse is an imposing edifice, erected in 1853 at a cost of $166,000. The county jail is a massive sandstone structure, with a tower 110 feet high, built at a cost of $110,000 in 1851. Lancaster is the center of one of the wealthiest agricultural regions in the United States. Its cotton, iron, and other mills are numerous and large, and it contains one of the most extensive watch factories in the country. Its tobacco trade requires nearly 100 large warehouses for its accommodation. A valuable trade in coal, lumber, leather, and grain is also carried on. The city (1901) covers 2,660 acres; its receipts for the year were $167,290, disbursements, $126,098; funded debt, $1,134,958. Pop. (1900), 41,459.

LANCASTER, the chief city in Fairfield county, Ohio, is situated on the Hocking river, about thirty miles southeast of Columbus. It is a well-built little manufacturing town, busy with foundries, flouring-mills, and various manufactures, such as agricultural implements and machinery. The courthouse cost $150,000; and the city hall and public schools are also fine buildings. The neighboring country is fertile, being especially noted for its grain, live stock, and vineyards. The population (1900) was 8,991.

LANCASTER, HOUSE OF. The name House of Lancaster is commonly used to designate the line of kings immediately descended from John of Gaunt, fourth son of Edward III. But the history of the family and of the title goes back a whole century further to the reign of Henry III., who created his second son, Edmund, earl of Lancaster, in 1267. His son Thomas, who inherited the title, took the lead among the nobles of Edward II.'s time in opposition to Piers Gaveston and the Spensers, and was beheaded for treason at Pontefract. At the commencement of the following reign his attainder was reversed and his brother Henry restored to the earldom, who, being appointed guardian to the young King Edward III., assisted him to throw off the yoke of Mortimer. On this Henry's death in 1345 he was succeeded by a son of the same name, a very valiant commander in the French wars, whom the king, for his greater honor, advanced to the dignity of a duke. The title was new in those days, for only one duke had ever been created in England before, and that was fourteen years previously, when the king's son Edward, so well known in history as the Black Prince, was made duke of Cornwall. This Henry died in 1361 without heir male. Of his two daughters, Maud, the elder, was twice married, but died childless little more than a year after her father. The second, Blanche, became the wife of John of Gaunt, who thus succeeded to the duke's inheritance in her right; and on November 13, 1362, when King Edward attained the age of fifty, he was created duke of Lancaster, his elder brother, Lionel, being at the same time created duke of Clarence. It was from these two dukes that the rival houses of Lancaster and York derived their respective claims to the crown. As Clarence was King Edward's third son, while John of Gaunt was only his fourth, it ought to have followed in ordinary course that on the failure of the elder line the issue of Clarence should have taken precedence of that of Lancaster in the succession. But the rights of Clarence were conveyed in the first instance to an only daughter, and the ambition and policy of the house of Lancaster, profiting by advantageous circumstances, enabled them not only to gain possession of the throne, but to maintain themselves in it for three generations before they were dispossessed by the representatives of the elder brother.

As for John of Gaunt himself, it can hardly be said this sort of politic wisdom is very conspicuous in him. His ambition was generally more manifest than his discretion; but fortune favored his ambition, even as to himself, somewhat beyond expectation, and still more in his posterity. Before the death of his father he had become the greatest subject in England, his three elder brothers having all died before him. He had even added to his other dignities the title of the king of Castile, having married, after his first wife's death, the daughter of Peter the Cruel. The title, however, was an empty one, the throne of Castile being actually in the possession of Henry of Trastamara, whom the English had vainly endeavored to set aside. His military and naval enterprises were for the most part disastrous failures, and in England he was exceedingly unpopular. Nevertheless during the later years of his father's reign the weakness of the king and the declining health of the Black Prince naturally threw the government very much into his hands. He even aimed, or was suspected of aiming, at the succession to the crown; but in this hope he was disappointed by the action of the Good Parliament a year before Edward's death, in which it was settled that Richard, the son of the Black Prince, should be king after his grandfather. Nevertheless the suspicion with which he was regarded was not altogether quieted when Richard came to the throne, a boy in the eleventh year of his age. The duke himself complained in parliament of the way he was spoken of out of doors, and at the outbreak of Wat Tyler's insurrection the peasants stopped pilgrims on the road to Canterbury, and made them swear never to accept a king by the name of John. On gaining possession of London they gave still more emphatic proof of their dislike to him by burning his magnificent palace of the Savoy. The young king himself shared the general feeling, and after a few years John of Gaunt ceased for a time to have much influence. Richard found a convenient way to get rid of him by sending him to Castile to make good his barren title. and on this expedition he was away three years. He succeeded, however, so far as to make a treaty with his rival, King John, son of Henry of Trastamara, for the succession, by virtue of which his daughter Catherine became queen of Castile some years later. After his return the king seems to have regarded him with greater favor, created him duke of Aquitaine, and employed him in repeated embassies to France, which at length resulted in a treaty of peace, and Richard's marriage to the French king's daughter.

Another marked incident of his public life was the support which he gave on one occasion to the Reformer Wycliffe. How far this was due to religious and how far to mere political considerations may be a question; but it is certain that, in one way or another, not only John of Gaunt but his immediate descendants, the three kings of the house of Lancaster, all took deep interest in the religious movements of the times A reaction against Lollardism, however, had already begun in the days of Henry IV., and both he and his son were obliged to discountenance opinions which were believed to be politically and theologically dangerous.

Accusations had been made against John of Gaunt more than once during the earlier part of Richard II.'s reign of entertaining designs to supplant his nephew on the throne. But these Richard never seems to have wholly credited, and during his three years' absence his younger brother, Thomas of Woodstock, duke of Gloucester, showed himself a far more dangerous intriguer. Five confederate lords, with Gloucester at their head, took up arms against the king's favorite ministers, and the Wonderful Parliament put to death without remorse almost every agent of his former administration that had not fled the country. Gloucester even contemplated the dethronement of the king, but found that in this matter he could not rely on the support of his associates, one of whom was Henry, earl of Derby, the duke of Lancaster's son. Richard, soon afterward, by declaring himself of age, shook off his uncle's control, and within ten years the acts of the Wonderful Parliament were reversed by a parliament no less arbitrary. Gloucester and his allies were then brought to severe account; but the earl of Derby and Thomas Mowbray, earl of Nottingham, were taken into favor as having opposed the more violent proceedings of their associates. As if to show his entire confidence in both these noblemen, the king created the former duke of Hereford and the latter duke of Norfolk. But within three months after the one duke accused the other of treason, and the truth of the charge, after much consideration, was referred to trial by battle according to the laws of chivalry. But when the combat was about to begin, it was interrupted by the king, who, to preserve the peace of the kingdom, decreed by his own mere authority that the duke of Hereford should be banished for ten years —a term which was immediately after reduced to five— and the duke of Norfolk for life.

This arbitrary sentence was obeyed in the first instance by both parties, and Norfolk never returned. But Henry, duke of Hereford, whose milder sentence was doubtless owing to the fact that he was a popular favorite, came back within a year, having been furnished with a very fair pretext for doing so by a new act of injustice on the part of Richard. His father, John of Gaunt, had died in the interval, and the king, troubled with a rebellion in Ireland, and sorely in want of money, had seized the duchy of Lancaster as forfeited property. Henry at once sailed for England, and landing in Yorkshire while King Richard was in Ireland, gave out that he came only to recover his inheritance. He at once received the support of the northern lords, and as he marched southward his followers became more numerous at every turn. The whole kingdom was soon practically at his command, and Richard, by the time he had recrossed the channel to Wales, discovered that his cause was altogether lost. He was conveyed from Chester to London, and forced to execute a deed by which he resigned his crown. This was recited in parliament, and he was formally deposed. The duke of Lancaster then stepped forward and claimed the kingdom as due to himself by virtue of his descent from Henry III.

It is unnecessary in this article to relate the history of the three successive kings belonging to the house of Lancaster (Henry IV., V., and VI.), as a brief epitome of their reigns will be found elsewhere. With the death of the last-named sovereign the direct male line of John of Gaunt became extinct. But by his daughters he became the ancestor of more than one line of foreign kings, while his descendants by his third wife, Catherine Swynford, conveyed the crown of England to the house of Tudor. It is true that his children by this lady were born before he married her; but they were made legitimate by an act of parliament, and, though Henry IV. in confirming the privilege thus granted to them endeavored to debar them from the succession to the crown, it is now ascertained that there was no such reservation in the original act, and the title claimed by Henry VII. was probably better than he himself supposed.

LANCASTER, SIR JAMES, an eminent English seaman of the Elizabethan period. In his early years he was in Portugal as soldier and merchant; in 1591 he made a voyage on his own account to the East Indies; in 1594–95 he had command of an expedition which made an attack on Pernambuco; and in 1600 he was placed at the head of the first fleet sent out by the newly-founded East India Company. During his later years he acted as one of the directors of the company. He died in 1620.

LANCASTER, JOSEPH, was born in Southwark, England, in 1778. At sixteen he looked forward to the dissenting ministry; but soon after his religious views altered, and he attached himself to the Society of Friends, with which he remained associated for many years, until long afterward he was disowned by that body. At the age of twenty he began to gather a few poor children under his father's roof and to give them the rudiments of instruction, without fee, except in cases in which the parent was willing to pay a trifle. Soon a thousand children were assembled; and, the attention of the duke of Bedford, Mr. Whitbread, and others having been directed to his efforts, he was provided with means for building a schoolroom, and supplying needful materials. The main features of his plan were the employment of older scholars as monitors, and an elaborate system of mechanical drill, by means of which these young teachers were made to impart the rudiments of reading, writing, and arithmetic to large numbers at the same time. The material appliances for teaching were very scanty—a few leaves torn out of spelling-books and pasted on boards, some slates, and a desk spread with sand, on which the children wrote with their fingers. The order and cheerfulness of the school and the military precision of the children's movements were very striking, and began to attract much public observation at a time when the education of the poor was almost entirely neglected. Lancaster had the skill which gains the loyalty of subordinates, and he succeeded in inspiring his young monitors with fondness for their work and with pride in the institution of which they formed a part. As these youths became more trustworthy, he found himself at leisure to accept some of the numerous invitations which crowded upon him, and to expound what he called " his system " by lectures in various towns. In this way many new schools were established, and placed under the care of young men whom he had trained. In a memorable interview with George III., Lancaster was encourged by the expression of the king's wish that every poor child in his dominion should be taught to read the Bible. In 1808 a few noblemen and gentlemen founded the society which was at first called the Royal Lancasterian Institution, but was afterward more widely known as the British and Foreign School Society. With the strongest wish to retain his services and to treat him with liberality, they soon found that he was impatient of control, and that his wild impulses and heedless extravagance made it impossible to work with him. He quarreled with the committee, set up a private school at Tooting, became bankrupt, and in 1818 emigrated to America. There he met at first with a warm reception, gave several courses of lectures which were well attended, and wrote to friends at home letters full of enthusiasm and of high hopes for future usefulness, not unmingled with bitter denunciations of what he called the ingratitude and treachery of those who had been associated with him in England. But his fame was short-lived. The miseries of debt and disappointment were aggravated by sickness, and he settled for a time in the warmer climate of Caráccas. He afterward visited St. Thomas and Santa Cruz, and at length returned to New York, the corporation of which city made him a public grant of $500 in pity for the misfortunes which had by this time reduced him to lamentable poverty. He afterward visited Canada, where for a time his prospects brightened. He gave lectures at Montreal, and was encouraged to open a school which enjoyed an ephemeral success, but was soon abandoned. A small annuity provided by his friends in England was his only means of support. He was run over by a carriage in the streets of New York in October, 1838, and was so much injured that he died in a few hours.

LANCELET (*Branchiostoma* [or *Amphioxus*] *lanceolatum*). This creature, the lowest in the scale of fishes, with which class it is generally associated, lacks so many characteristics of vertebrates generally that some naturalists regard it as a type of a separate division. It is of small size (about three inches long), compressed, semi-transparent, pointed at both ends, without limbs, but with a low fold of skin, representing the median fin of fishes. The mouth, surrounded by tentacles, is situated below the anterior end of the body, the vent at a short distance from the opposite end. The water which has been received through the mouth for the respiratory function, as well as the spawn, are expelled by another opening in front of the vent. The skeleton is extremely rudimentary, and consists almost wholly of a simple notochord; neither skull nor ribs nor limbs are developed. The lancelet possesses no brain or organ of hearing, and no kidneys. The heart retains the embryonic condition of vertebrates, is tubular and without chambers; the blood is colorless. Thus the lancelet shows unmistakable analogies to invertebrates, among which, indeed, it was placed by its first describer, Pallas; and as, besides, the earliest stages of its development are almost identical with those of invertebrate animals, it may well be regarded as a form intermediate between the two great divisions of the animal kingdom, viz., the vertebrates and invertebrates.

The lancelet has been found in numerous localities of the temperate and tropical zones, sometimes in deep water, but more frequently in shallow sandy places of the coast; probably it is much more common than is generally supposed, but easily escapes observation on account of the transparency of its body, and the rapidity with which it buries itself in the sand.

LANCEWOOD is a straight-grained, tough, light, elastic wood, obtained from the West Indies and Guiana. It is brought into commerce in the form of taper poles of about twenty feet in length and from six to eight inches in diameter at the thickest end. Lancewood is principally used by carriage-builders for shafts; but since the practice of employing curved shafts has come largely into use it is not in so great demand as formerly. The smaller wood is used for whip-handles, for the tops of fishing-rods, and for various minor purposes where even-grained, elastic wood is a desideratum. The wood is obtained from two species of *Guatteria*, a genus belonging to the natural order *Anonaceæ*. The black lancewood or carisiri of Guiana (*Guatteria virgata*) is a tree which grows to a height of fifty feet, of remarkably slender form, and seldom yields wood of more than eight inches diameter. The yellow lancewood tree (yari-yari of Guiana) is of similar dimensions, found in tolerable abundance throughout Guiana, and used by the Indians for arrow-points, as well as for spars, beams, etc.

LAN-CHOW-FOO, the chief town of the Chinese province of Kan-suh, and one of the most important cities of the interior part of the empire, stands on the right bank of the Yellow river. The population was estimated at 500,000 in 1898.

LANCIANO, the chief town of a circle in the province of Chieti, Italy, is situated on three hills, about five miles from the Adriatic coast. It is one of the most beautiful cities in the Abruzzi Citeriore, and has broad, regular streets, and several fine buildings.

LANCRET, NICOLAS, was born in Paris January 22, 1660, and became a brilliant painter of light comedy, but of light comedy which reflected the tastes and manners of French society under the regent Orleans. His first master was Pierre d'Ulin, but his acquaintance with and admiration for Watteau induced him to leave D'Ulin for Gillot, whose pupil Watteau had been. Two pictures painted by Lancret and exhibited on the Place Dauphine had a great success, which laid the foundation of his fortune, and, it is said, estranged Watteau, who had been complimented as their author. In 1719 he was received as Academician, and became councilor in 1735; in 1741 he married a grandchild of Boursault, author of *Æsop at Court*, but he survived his marriage only two years, dying, in his eighty-fourth year, on September 14, 1743.

LAND, in the sense in which it will be used in this article, which treats especially of its possession and tenure, includes that portion of the earth of which industry has rendered either the surface or the mineral riches underneath available for human requirements. It forms thus the storehouse from which nearly all human wealth is drawn, since it nourishes the animals and plants which supply mankind with food and clothing, and yields the stone, the coal, and the metals which make existence possible and progressive. The history of its use is therefore a main element in the history of our race, and the manner of its tenure and employment lies at the root of political and economic science.

The history of land commences with the division of men into tribes, for the division of tribes involves distinction of territory. The earliest age, when men lived solely on wild fruits or on the produce of the chase, may still be pictured to us in the habits of the North American Indian, while the second or pastoral stage is represented in modern times by the life of Tartars of the Asian steppes. In both these conditions an immense tract of country is absorbed in the support of a small population, but the hardships of existence, aided sometimes by organized systems of child-murder, serve to keep the inhabitants within the limits of subsistence. Under such circumstances each tribe jealously guards its own territory from intrusion by others, but within its range all members of the community have equal and unrestricted rights of use. Among civilized nations the principle still survives. Each modern nation claims a special ownership in the fisheries within a certain distance of its coasts; but among the inhabitants of these coasts there is a common right to fish in the waters thus reserved. So also each modern state recognizes the shores as far as high-water mark, and the estuaries with their harvests of wild fowl, as the common property of its subjects. Even inland game is still not individual property, and in countries where legal rights are so ancient or so modern as in the Channel Islands and the United States of America, the local law is alike liberal in allowing to everyone the right of sporting over his neighbor's ground, except in so far as modified by express and recent legislation.

But the higher races very early discovered an ampler means of industrial existence than the natural produce of the earth affords. At what period in human history the artificial cultivation of plants was discovered it is impossible to say. We know that it was posterior to the division of the Aryan currents that flowed toward Hindustan and toward Europe, but before the subdivision of the latter; for the words denoting a field, a plow, and some species of grain have a common root in the Greek, the Latin, and the Germanic dialects, but not in the Sanskrit. But so soon as agriculture began it involved of necessity an approach to more settled habits. This change in the manner of life would combine with the fuller and more regular supply of food to promote a rapid increase of population. So long, however, as this did not exceed the resources of the territory belonging to the tribe, it would not of itself involve any change in the idea that its use was common to all. A certain portion of ground would be devoted to tillage, a certain number of the tribe would be appointed to perform the acts of cultivation, and the produce would be stored in the general barn. We have at the present day examples of such a system in some of the allmends of the Swiss canton of Valais, where a portion of the lands of the village is cultivated by joint labor, and the produce devoted to joint feasting. But it appears that in general this stage rapidly progressed to one of apportionment of the land in separate and smaller districts. The tribe, augmenting in numbers and perhaps in extent of territory, subdivided itself into villages, and each village exercised a tolerably independent rule over its own district. Within this range it still maintained a community of the forest and pasture, but the special skill and toil demanded by husbandry in most cases soon led to the appropriation to each family of a portion of the arable land in exclusive property. Still, however, the principle of common right prevailed so far that the village rulers changed every year the lots assigned for culture, so that one year of crop, followed by a relapse into natural growth for a succession of years, was the normal rotation. It is one which modern science cannot condemn, for where space is ample and the use of manure is unknown, there is no sounder method of cultivation.

It is at this stage that contemporary observers first describe the tenure of land in ancient times, and illustrations of its survival in modern periods grow abundant. But except in special circumstances it is obvious that progress could not stop here. As population increased in each district, the available hunting grounds would diminish, and at the same time the necessity of more extensive and more frequent cultivation of crops would increase. By this process, in the absence of manure, the land would inevitably become less productive. But just as it demanded more labor it would become more definitely appropriated to a single family, for those who labored most would not willingly give place to those who had been less active. A stage would then be reached in which community of possession would be limited to the pasture lands of the village, and the arable lands would be possessed in permanence by each family. There generally was, indeed, while the territory still sufficed, a recognition of the right of each individual to an allotment from the common land. But at last the period would come in which this could no longer be afforded, and when either the tribe must migrate in a body, or cast off a swarm to seek its fortunes elsewhere, or leave a certain number of its members without the privilege of landed possession, to obtain subsistence in services to the rest, or in trades. When the two former alternatives become impracticable, the third is the inevitable course. Private property in land becomes then established, and we have thenceforward a new system, involving consequences for good and evil which legislation seeks to regulate.

With this general notion of the course of development it will now be convenient to trace, in some instances which have most affected the world's progress, the history and the results of the use and appropriation of land.

In primitive Rome each household formed an absolute despotism, of which the father was the despot; households were united into gentes by derivation from a common ancestor, and the state consisted in a combination of gentes. To each household there was originally assigned a small portion (two jugera, one and a quarter acres) of land to be held in perpetuity as private property *(heredium)*, and it may be assumed that on the death of a paterfamilias each son would be entitled to a like amount from the common lands of the gens. These common lands formed the main possession of the gentes, and it appears that they were to some degree cultivated in common, as well as used for pasturage. The state, however, also held common lands, partly original, partly derived from cession by each conquered neighbor, and these were let for rent *(vectigal)* in so far as not partitioned out. Cicero says that Numa was the first who divided the conquered lands into private shares, but it is certain that the example was only partially followed. But by the time of Servius Tullius the original private portion of many households must have been greatly but unequally enlarged, for his new military organization was based on the obligation of service imposed on the freeholders *(assidui)* as distinguished from the mere laborers and breeders of children *(proletarii)*. The "classes" of the assidui were five, those who possessed twenty jugera (twelve and one-half acres), and who were specially denominated classici, and those who possessed respectively fifteen, ten, five, and two and one-half jugera. The first class, or classici, were about the half of the whole number of assidui, the second, third and fourth classes comprised each about one-eighth of the entire number, and the fifth class was slightly more numerous. The equites formed a separate order, based on the possession of a still larger extent of land. At the same time a register of land was established, in which each owner was required to enter his property, and which was revised every four years, and sales were directed to be made before two witnesses. These arrangements show that even at this epoch the system of separate private property was in full operation, and that the difference of wealth which it engenders had already reached an advanced stage.

The progress of conquest, which at once enlarged the territory, brought in tribute, and furnished slaves, rapidly increased such inequalities. Trade, which followed conquest, and in which capitalists made large fortunes, tended in the same direction. Very early in Roman legal history we come upon tenancy-at-will, under the name of *precarium*, which of itself showed that there must have been large estates capable of subdivision. But besides tenants, each extensive landowner had a household of retainers, clients, freedmen, and latterly slaves, who tilled his ground for his personal profit. Thus there would be little demand for free labor, and the petty husbandman, whose small inheritance was inadequate for a growing family, fell necessarily into debt. His land would then be seized under the strict Roman law of bankruptcy, and he himself would sink into slavery, or at best into the already overcrowded class of laborers for insufficient hire. At the same time the conquered lands, which by theory were the property of the state, and to which every citizen had an equal right, were largely portioned out to the existing landowners, who held the chief posts and influence in the government. The revenues drawn from tribute were also farmed out to capitalists, and the taxes on the public were augmented in consequence of the permitted frauds of the collectors. At last came the crisis. The army, no longer representing the wealth of the state, but rather the proletariat, mutinied, and from the Mons Sacer menaced the city. It was the commencement of the long struggle of which the successive AGRARIAN LAWS (*q.v.*) were the landmark and remedies.

The object of these laws was well illustrated by the Licinian proposal (387 A.U.C.), nearly one hundred years after the first outbreak of discontent. It enacted that no citizen should hold more than 500 jugera of the public lands, that no one should graze more than 100 oxen and 500 sheep on the common lands, and that every landowner should be obliged to employ a number of free laborers proportioned to that of his slaves. But this, as all other laws proposed on behalf of the people, was coupled with political changes of which the main object was to open up new fields of ambition to those of the plebeians who were already opulent. When that object was attained, the agrarian remedies were suffered to fall into desuetude. The successful wars waged in the sixth and seventh centuries A.U.C. gave a temporary outlet to labor in the formation of agricultural colonies. But it at the same time immensely increased the number of slaves, who were treated as mere beasts of toil, to be worked out or sold off when no longer profitable. The free population, on the testimony of Cato and Polybius, diminished; the slave population increased, and became in many districts an organized danger to public safety. A century later the Gracchi again endeavored to restore health to the body politic by a distribution of the state lands among the proletariat. The attempt was stifled in blood, but the necessity of the measure was proved by the fact that a full generation later Caius Julius Cæsar carried out the same reform.

The time for remedy was, however, past. The great estates (*latifundia*) had already been created; they were respected by the reformers, alike popular and imperial; and their inevitable growth swallowed up the small farms of new creation, and ultimately destroyed Rome. For its manhood was gone; the wealth of millionaires could not purchase back honesty or courage; and the defense of mercenaries failed to form any barrier against the wars of hardy northern invaders. Pliny's words "latifundia perdidere Italiam" embrace the truth, yet more fully made clear in many a generation after he wrote.

We shall now examine the systems prevalent in the nations by which the Roman empire was overthrown. Two great Roman writers, Cæsar and Tacitus, have given us a vivid picture of the German customs showing us the tenure of land in its earliest forms. Cæsar says of the Germans of his time:—

"They are not much given to agriculture, but live chiefly on milk, cheese, and flesh. No one has a fixed quantity of land or boundaries of his property, but the magistrates and chiefs every year assign to the communities and families who live together as much land and in such spots as they think suitable, and require them in the following year to remove to another allotment. Many reasons for this custom are suggested: one is that they should not be led by permanence of residence to renounce the pursuits of war for agriculture, another that the desire of extensive possession should not induce the more powerful to seize the land of the weaker, another that they should not construct their houses with greater care to keep out heat and cold, another that the love of money should not create parties and disputes, and lastly that the mass of the people might remain contented with the justice of an arrangement under which everyone saw his position as comfortable as that of the most powerful. As to the tribes themselves, their chief glory is to have their territory surrounded with as wide a belt as possible of desolated waste. They deem it not only a special mark of valor that every neighboring tribe should be driven to a distance, and no stranger should dare to reside in their vicinity, but at the same time they view it as a measure of precaution against the risk of sudden attacks."

A hundred years later the description of Tacitus shows that a certain modification of habit had been induced. Bringing together the leading particulars, we find he speaks of Germany as "covered with woods and morasses, the land fairly fertile but unsuited for fruit-trees, well adapted for pasture, and carrying numerous herds of small-sized polled cattle, in which the chief wealth of the natives consisted." But they seem no longer to have changed their actual dwellings every year, but to have "built them with a certain rough solidity, and in villages, though the houses were not contiguous, but each was surrounded by a space of its own. The right of succession by children was recognized, and in default of children brothers and uncles took, but there was no right of making a will. They preferred to acquire property by war rather than by industry. Interest on loans was unknown. The land was apportioned (to villages apparently) according to the number of cultivators, and divided among them according to their rank, there being ample room for all. Every year they changed the arable land, which formed only a portion of the whole, not attempting to make labor vie with the natural fertility and abundance of the soil by planting orchards or setting out gardens and fields, but content with a single crop. Their food consisted chiefly of wild fruits, freshly killed game, and curds; their drink was a liquor prepared from barley or wheat, fermented like wine. Their slaves were not kept in the house, but each had a separate dwelling and an allowance of food, and they were treated with humanity, as servants or tenants."

These institutions were then obviously based on the existence of an ample supply of uninclosed and common land. But the natural increase of population, combined with the pressure put on the Germanic tribes from the east by the Slavs, made their territories too small for their ambition, if not for their maintenance, and five or six succeeding centuries were marked in the history of Europe chiefly by successive Germanic conquest and occupation of western and southern territory. The enormous increase of power and possession made it impossible for the original tribal government to survive; the great generals developed into kings and emperors, and their lieutenants, more or less independent according to individual capacity and distance from the capital, became dukes and counts. Gradually military authority, embracing the old idea of the land being the property of the state, evolved the new notion of feudalism. The sovereign represented the state; to him in that capacity land conquered from the enemy, or forfeited by unsuccessful rebellion, became subject; and he granted it to his followers on condition of faithful service in war. They promised to be "his men," and from their own tenants they exacted in turn the like promise on the like conditions. The general insecurity made even free owners willing to buy the support of the sovereign on similar terms. Thus by degrees, less by derivation from the ideas of Roman law, to which it is sometimes attributed, than by the mere necessity of the times, and as a consequence of the incessant state of warfare in which mankind existed, there came to be established the feudal doctrine that all land was held of the sovereign on condition of suit and service, and that each immediate tenant of the sovereign was entitled to sub-infeudate his possession on the same principles. Gradually the further attributes of property were added; service in war was commuted into rent, and the peaceful service of tilling the lord's reserved domain. The right of hereditary succession became grafted on the personal grant; the power of sale and devise followed Local usages still had influence, but it may be said broadly that from about the tenth century private property, subject to feudal conditions, became the principle of the tenure of land in Europe.

There are, however, some nations in which feudalism has struck no root, or at least has not succeeded in seriously modifying the original type of common possession. It will be best to advert to some of them before proceeding further with the history of feudalism in its modern development.

The Indian branch of the Aryan stock has preserved with great fidelity the original notion of the possession of land. The village, consisting of detached houses and surrounded with the district belonging to it, forms still a self-regulating community. It is a legal person, to which the state looks for its rights, but which when performing them is free from internal state interference. It holds the forest and pasture ground in common property, allowing their use to each person entitled to the village rights. To each family is further apportioned a measure of arable land, but the stage is in general passed at which this portion is changed in successive years, and it is therefore the hereditary property of the family. But it is not in strictness subject either to will, to mortgage, or to sale. It is divisible on the death of the head of the family among his children, any of whom may transfer their shares to another member of the village, but not, except with its leave, to a stranger. These ancient customs have to some extent been modified by the introduction of English law, which, among other things, has subjected the villagers to the grinding exactions of the money-lenders, by giving creditors the security of an English mortgage. It cannot but be regretted that the desire to act justly which has led to the change should have been misled by the idea that whatever institution exists in England is necessarily and everywhere else equally equitable and necessary.

In Europe the Slav peoples, the latest arrival of Aryan stock on the continent, have preserved best the ancient characteristics of land tenure. Checked in their advance to the southeast, they have formed a narrow borderland in Bulgaria, Servia, Croatia, and Dalmatia, between the Germans on the one side and the Turks on the other. Here, therefore, we have the case of a population growing within a restricted area, under circumstances which prevented the development of extensive military sway, and its consequent feudalism. Accordingly we find prevailing a system midway between the ancient communism of the Germanic tribes and the institution of private property. The tribes have become broken up into families. Common lands, except where there is mountain or forest, have been partitioned into the separate ownership of families. But within the families there is still a strong sentiment of community. In the Servian and Bulgarian villages each family household consists of probably several generations, all housed under the same roof or within the same curtilage. The head of the family is judge rather than master; any member of the family may depart, but in so doing he abandons his claim to the family property, a claim, however, which in some cases may revive should he return to the paternal home. All who remain work in common at their appointed duties, and share in common the produce. The family possessions are inalienable; the share of each member is untransferable.

To the north and east the faculty of unlimited emigration to the unoccupied lands of the steppe permitted or enforced the preservation of a still earlier type of common property. When the Russian village found its lands inadequate to its growing population, it threw off a swarm. The emigrants traveled in a compact body till they passed beyond the limits of present cultivation, and then took up their position on such lands as pleased them. For their protection against the aboriginal hunters who still roamed over the plains they built their houses on the uniform plan of an inclosed village, and the same reason concurred with native habit to induce them to maintain the system of common pasturage, and of united cultivation of the land apportioned to cropping. When the central government became strong enough to assert its sway over the scattered settlements, it levied its tax on the ***mir***, or village community, and the community apportioned the amount per capita among its members. But, as land was ample in extent for all, it gave to each male, from the moment even of birth, a right to a share. When the shares became inadequate a fresh migration took place.

Serfdom took its rise in the prohibition of these migrations. Forbidden to depart to new lands, the peasants were compelled to submit to the demands for their labor either of the government, where it held estates in the neighborhood of a village, or of nobles to whom grants of land had been made by the czar. Generally they were thus forced to give half their time to labor for their master. But they still continued possessors of their share in the village lands, and entitled to apply the other half of their time to its cultivation.

When emancipation came, their rights were regulated on the same basis. The village was maintained as an industrial and fiscal organization. But each peasant was declared to be entitled to a certain fixed minimum of land for his own property, varying according to the district, but on an average about twelve acres. For this, in so far as being in excess of the village lands it had to be made up from the land of adjoining owners, he is required to pay either services, to the extent of forty days in the year, or rent, at an average rate of about 2s. 4d. per acre. Such provisions can only be temporary. They resemble much those which prevailed in Germany prior to the modern reforms in tenure. They subject the peasant, untaught and unaccustomed to habits of individual energy, to a tax which he is not able to meet, and the suffering and complaints which are the consequence are at present general throughout Russia.

In Switzerland also there has survived a system only slightly altered from that of the original communities. For here also conquest with its attendant feudalism was stayed, and freemen and free institutions survived the wreck which war made throughout western Europe. In the forest cantons especially there still exists an essential community of land right. The inhabitants possess separately and by ordinary rules of inheritance certain portions of land But in several cantons the bulk of the land, both arable, forest, and pastoral, forms the allmend of the state, or of the commune—the common property, to which every descendant of the original inhabitants has a right. This common land is either partitioned out by lot to each person entitled, or is let for a rent, which is applied to the common benefit, or is made the subject of common labor, and the produce of bread and wine is devoted to common merry-makings. When the arable land is divided among cultivators, the period allowed before repartition is from five to nine years, and it is stated that so strong is the feeling of common interest that the shortness of the time does not interfere with the highest cultivation by each successive occupant. In some districts it furnishes farms of twenty acres to each family, in others it only suffices for allotments of a few perches.

In France the custom of village proprietary survived in many districts down to the middle of the seventeenth century. But previous to the middle of the eighteenth century nearly the whole of the soil had passed into the hands of great landowners. The tenants and peasants were ground down with heavy exactions, not only in the form of rent, but of state taxation, and in services, or *corvees*, to be rendered to the lord or to the state. The artificial life of the nobles at court destroyed all sympathy between them and the cultivators, and brought them to look on their dependents as little more than beasts of burden, valuable only for the profit that might be made of them. The feeling engendered on the other side broke out in the Revolution. The country estates, from which the *emigres* had fled, were sold in portions, and in many cases bought in fee simple for a trifle by the former tenants of the farms. The law of equal division among children continued the process of subdivision. It proceeds in an augmenting ratio, and though a few large properties still subsist, the bulk of the land in France is now held in small properties. It is not, however, universally cultivated by the owner. There is a large proportion of tenants, holding generally under leases not exceeding nine years; and there is no doubt that the shortness of the term impairs production. Another evil is the *mercellement* caused by the law of compulsory division on inheritance, but this must not be understood as objected to chiefly on the ground of the small extent of ground held by each proprietor. The real disadvantage complained of by French writers on agriculture is that through successive family divisions each man's total property consists of a number of small plots scattered up and down; and the remedy desired is not an interference with the present law of succession, but only an enactment to facilitate exchange and consolidation of plots, so as to give to each cultivator his whole property within one boundary.

In France there are now about 2,000,000 properties under twelve acres, and 1,000,000 between twelve and twenty-five acres, while there are only 150,000 above 100 acres. Of the whole population there are 1,750,000 who cultivate their own land with their own hands, and who are not tenants, 850,000 who cultivate as tenants, and only 57,000 who cultivate by aid of a foreman or steward. Of farm laborers there are only 870,000. Belgium, Switzerland, Denmark, Norway, Sweden, and great portions of

Italy are similarly divided into small holdings cultivated in general by the owner and his family.

In Germany, although feudalism was fully developed as a legal system and as the foundation of the aristocracy, it did not succeed in extirpating entirely the ancient rights of the people. A large portion of the land was held always as peasant properties, entirely free from any dues of service. Among these, in certain districts, there survived an organization essentially identical with that described by Tacitus. The village had its domain or mark, subdivided into the arable, the pasture, and the forest. In some cases the first of these was partitioned into individual and permanent properties, but in all the pasture and forest remained the joint property of the village. Instances, however, were not wanting even in our own days where the arable portion was subject to annual or less frequent repartition, and to apportionment by lot to each cultivator for the time which custom ordained. But even where this usage did not prevail, it was incumbent on all the villagers (as in Russia) to cultivate their several portions of the arable mark with the same crops and at the same seasons, for as soon as the crops were removed the whole community enjoyed a right of pasturage on the stubble. The rotation was, therefore, of the simplest, consisting in general of a triennial succession of wheat or rye as winter-sown grain, followed by oats and barley as spring-sown crop, and then fallow. It differed for the worse from that of the ancient Germans in that the circumscribed limits of each village domain made it now impossible to allow to the whole arable mark a period of rest under pasturage.

But intermixed everywhere with the relics of the free village institutions the tree of feudalism struck its roots, and carried with it a species of serfage. None who were not noble could as a rule purchase land. On the lands of the nobles the tenants were bound to give to their lord a portion of their time in gratuitous labor. They held, however, their farms under conditions of permanency, subject to this tax of labor, and to a variety of small and irregular exactions of the nature of rent. On this state of things in Prussia the Stein and Hardenberg reforms took effect. They gave to every peasant the same power as the noble enjoyed to become a landowner. Between the nobles and their tenants they partitioned the land in absolute property, the landlord retaining one-third, the tenant receiving two-thirds. Common rights, and rents, were made purchasable by the owner of the soil at twenty years' purchase of their estimated value. And laws of 1821 and 1850 sanctioned the division of common lands among all who previously had an interest in them. To aid the peasantry in purchasing up the dues still payable to their former landlords, land credit banks were introduced in 1850. These institutions advanced to the peasant owner the sum necessary for the purchase of the old rights over his property, commuted as they had already been to a definite sum. The advance thus made constituted a first charge on the land, and was represented by debenture bonds for small amounts. The owner might pay to their credit, at whatever time and in whatever sums he was able, installments toward their redemption, but he was bound to redeem them fully within fifty years.

These reforms have converted large parts of Germany into the property of small owners residing on and tilling their own land, free from obligation to any other person. There do not seem to be data for judging of the economic result, because statistics do not distinguish between the produce of small properties and that of the large properties intermixed with them. But the most careful observers agree that the social results are similar in Germany to what they are elsewhere. The peasants, attached to their holdings, form the most stable element in the commonwealth. Their love of the land shows itself in the high prices given for it, and, as we shall see elsewhere, in the tendency to borrow in order to purchase more. It can at least be said that, whatever be the hardships of their lot, they would not exchange it for any other.

The tenure of land in Great Britain may be traced with sufficient accuracy from the character of the elements of which the nation is composed. Under the Celtic tribes there can be no doubt that the ideas which we know prevailed among the ancient Irish and among the Scottish clans down to modern times formed the universal rule. The land was the possession of the clan; the chief was the leader, but not the owner. The temporary and partial occupation by the Romans may have introduced the notion of absolute private property, and we may assume that it was at least asserted by such of the conquerors as cared to cultivate estates taken from the barbarians. But the withdrawal of the Romans, followed by the Saxon invasion, must have reestablished the principle of common village ownership which formed the basis of both Celtic and German tenure. In the later Saxon period, however, there is no doubt that private ownership became gradually more extended. Then the feudal idea began to make progress in England, as it did at the same period on the Continent. It received an immense impulse from the Norman Conquest. William may not have claimed the whole land of England as his own, but the vast tract which fell into his hands through confiscation of rights of so-called rebels were granted by him in the character of lord to such of the Saxons as he could trust, and to those of his own followers whom he desired to reward. When law began to form a system, the early Norman lawyers took this principle as the basis of their system. Thenceforth it became the undisputed maxim of English law, as well as of Scottish (with the exception of some isolated remains of "udal" rights in Orkney), that the sovereign was supreme lord of all the land, and that everyone held under him as tenant in England, vassal in Scotland, names which have survived in legal theory and language down to the present day. They expressed then as now the unquestionable legal rule that there is no such thing in our system as an absolute private right of property in land, but that the state alone is vested with that right and concedes to the individual possessor only a strictly defined subordinate right, subject to conditions from time to time enacted by the community.

In England feudal forms became partially obliterated at an early period. In 18 Edward I. parliament had put an end to sub-infeudation. The services due by the crown's tenants were by a statute of Charles II. reduced to a form which left them merely nominal. But at a very remote period there had sprung up a tenure which in many respects was equivalent to feudal tenure. The serfs who cultivated the lord's lands, although at first subject to his absolute pleasure, yet, being left undisturbed for a considerable series of years, fell under the doctrine of English jurisprudence which recognizes custom as having the force of law. They gained thus a right of occupation in permanence, paying only such rents or services as were entered in the copy of the rolls of the manorial court, from which their tenure came to be designated copyholds. By degrees they obtained manumission from servitude, and with it the right of alienating or bequeathing the land they thus held. There were therefore two principal classes of property in England, freeholds, holding in general directly of the crown, and copyholds, holding of a lord of the manor, but both with indefeasible title subject to trifling services ascertained by custom or by statute. It would seem that in these two forms a very large number of those whom we now should call yeomen or peasant proprietors were established throughout the country. But in addition to these there were on the large estates a great number of those whom we should now properly call tenants-at-will, renting lands of the lord, and not established for a sufficient length of time to have acquired the status of copyholders.

About the middle of the fourteenth century English wool was found to be peculiarly well adapted to the use of the weavers of the Low Countries, and brought a high price. This led the owners of the large estates to substitute pasturage for tillage, and by consequence many of the cultivating tenants-at-will were evicted. Hence arose complaints precisely similar in motive and language to those which in our own times have been excited by the clearings in Ireland and the Highlands for the purpose of substituting sheep farming in place of husbandry by cotters and crofters. During the fifteenth century, probably for the same reason, the extensive wastes which covered a large part of England began to be inclosed, to the consequent disturbance of a number of squatters (called at the time "champions," from *champs*) who had settled on them, and derived a not very sufficient subsistence from feeding a few animals on the commons. It is noticeable that both Fitzherbert and Tusser, the earliest English agricultural writers, and the latter himself one of the people, commend the inclosures, on the ground that the land so reduced to separate ownership produced much more than it had done as commons. But these causes, combining with the breaking up of the monasteries, and the absorption of church lands into the estates of the adjoining landowners, gave rise to much disorder and misery. Parliament attempted to deal with the causes and effects by enactments directed by turns against the high rate of wages, against the destruction of farmhouses and cottages, and against the idle or unemployed tramps who roamed over the country. It was a period of dislocation of social relations, of which we are not now in a position to judge accurately. But undoubtedly the ultimate result was a considerable increase in the magnitude of the larger estates and farms, gained by a proportionate decrease in the number of both of smaller size. It is from this period that we must date the diminution of the class of yeomen which has been the theme of lamentation with economists and historians down to our own times.

Contemporaneously with these changes the law was receiving those adjustments which tended to preserve the large estates undiminished in the possession of their hereditary owners. Entails were sanctioned by statute, but broken down some two centuries later by the ingenious judicial devices of fines and recoveries. Trusts were invented by the churchmen, but attacked by parliament, only to be re-established under the technical name of trusts upon uses. Lastly, estates for life were invented; and, being skillfully combined with so much of the principle of entails as the courts had sanctioned, they have formed the still existing method by which family estates are preserved from dispersion. The rule of law is that all persons living at the date of a settlement are thus restricted to mere estates for their own lives, instead of taking a fee simple with full right of alienation. In this way each heir of such lands finds himself merely a tenant for life, and as such possessed of no power to prevent his own son from becoming owner in fee simple when he in turn shall succeed. But a father so situated is little inclined to leave to his son powers of which he himself is deprived, while his son is generally willing to barter his future liberty for a present liberal allowance. Thus father and son strike a bargain; the father buys the son's surrender of his future right, and the son, for a price, agrees to submit himself to the restraints of being merely tenant for life when his father shall die. The process repeated from generation to generation has re-established in practice the system of entails which the courts had abrogated as contrary to public policy, and which every writer from Bacon downward has denounced as hurtful to the nation.

In the countries which have been colonized from England the system of small properties rather than large has been generally adopted. The first settlers in New England carried with them the idea of the village community. They decreed that grants of land should be made to each householder to the extent of twenty acres, but the rest of the land apportioned to each village was to be held in common. This system has been now expanded into the homestead law (see **HOMESTEAD**), prevailing over most of the United States, in virtue of which a citizen of the country is entitled to a free grant of 160 acres (one-quarter square mile) on condition of bringing it into cultivation within five years. The influence of slavery in the Southern States tended, as in Rome, to create large estates, but its abolition has arrested this course. On the whole, with exception of a very few gigantic farms in the extreme west, it may be said that both the United States and Canada are countries of small farms, seldom exceeding 150 to 300 acres, and almost universally cultivated by the owner. The pastoral lands of Australia and New Zealand are still held in "runs" of immense extent, but whenever cultivation makes way there is a growing movement in the direction of opening them up to purchase in small farms.

The above sketch, imperfect as the limits of space have compelled it to be, of the history of land tenure throughout the world shows that it has pursued one unvarying course. Commencing in community of tribal possession, land has everywhere by degrees been appropriated to the villagers, to the family, and at last to the individual. But in every stage the conditions of its enjoyment and use have been absolutely regulated by the community in reference to the general welfare. A history so uniform would seem to rest on principles of human nature, and to be incapable of reversal. Nevertheless, in the present age two opposite parties have impugned its lessons. The one would revert to the almost prehistoric times when community of property, of labor, and of wealth formed the rule of existence. The other speaks of individual property, especially in land, as a sacred and indefeasible principle, and denounces every restraint or modification introduced by the state as spoliation. Between these extremes an infinite variety of ideas for more or less making land or its produce public property, or more or less restricting the right of the personal owner, have been put forward, and are, with some confusion, strenuously advocated. A brief attempt will now be made to discriminate between what in these ideas is sound and what is impracticable.

The principles of communism have unquestionably struck deep root in the minds of large classes of the public, chiefly in Germany, but to no inconsiderable extent in other countries and even in England. Nor can they be dismissed as merely criminal and worthy of no answer but repression. The answer must rather be that they are based on hopes and beliefs in the capability of human nature for self-sacrifice, which we have no warrant in yet accepting as our practical guide. A golden age may yet return, in which all shall be for the country and no one for himself, and we may even imagine that each successive age shows its nearer approach. But at least it has as yet not come. In every community there are found a large number of individuals who would not work honestly except under the compulsion of self-interest or of close superintendence. No socialistic scheme has yet been devised which copes with this tendency. In all of them a vast hierarchy of official inspectorship would be demanded, which, even if adequate, would eat up the profits. In all of them red-tapeism of regulation would forbid the progress derived from freedom to experiment. For the case of the culture of land, an art involving such variety of method applied to such variety of circumstance, it seems, as yet, impossible to conceive arrangements by which joint possession could result in beneficial production. We know it even among families to be at present a hindrance and source of loss. Nor has any definite scheme been yet proposed by socialists to show how it could be worked by the state. Till its advocates at least do this, and permit us to judge as men of business of the practical effect of their system in a given area and with given machinery, it were waste of time to discuss their aspirations and their imaginary results.

Those who, at the opposite pole, refuse to admit the right of the state to impose such conditions on private property as it deems for the general benefit may be dismissed even more briefly. Not only do they show entire ignorance of the history of land tenure at all times, but they belie the daily action of British legislation. Parliament seldom lets a session pass without making laws which assert the right of the state to take possession of property for public or private benefit, to tax it, and to restrain or regulate the rights of its owners over it. Nor is there any theory of the basis of property which does not tacitly admit that it is subject to the authority of the community. If derived from occupation, it owes its title to the agreement of the community to support that title. If derived from labor, it is valid only for the life of the laborer, and whoever succeeds to him must take it, not as a gift from a dead man whose rights end with the grave, but as a gift from the state, which deems that there is advantage in encouraging labor by the certainty of transmitting its produce. In every view it must be admitted that the state, by whose regulations and force property is maintained, must have an unqualified right to prescribe the conditions under which it will confer its gifts on private individuals.

The general object of supporting private property in land is to increase its produce, by inducing the owner, through motives of self-interest and affection for his family, to bestow on it the greatest amount of labor. It is agreed by all practical authorities that the soil of Great Britain might be rendered greatly more productive by the increased expenditure of capital, which, when explained, means in one shape or other the larger employment of labor, both in effecting permanent improvements and in conducting the arts of cultivation. The interest of the public in strengthening the motives which may lead to such additional production is unquestionable. The soil is the support of the nation, furnishing to it primarily both its substance, its clothing, its fuel, and the raw materials of its trade with other countries. Some indeed argue that freedom of trade with other countries, permitting unrestricted import of all these articles, has rendered the profitable use of the soil at home comparatively unimportant. But this is inaccurate for several reasons. First, importation involves at all events the expense of all that labor which is devoted to the carrying trade. Secondly, it involves dependence on other nations for other articles than food, to an extent which may easily become fatal. If, for instance, agriculture in England were to employ less labor, because it was more profitable to import wheat for subsistence and cotton on which to employ laborers, there is not only the risk, sufficiently grave, that both may be stopped by war, but the ever present probability that manufacturing industry may be displaced by competition from countries where its raw material can be obtained without the cost of carriage, and where in some cases labor may, owing to climate or a lower standard of living, be cheaper. Such a rivalry is already visible in America, in India, and in Russia. If through these causes the manufactures should decay, and the artisans be driven to emigrate, certainly the depopulated fields of Great Britain would be unable to maintain her in her present rank among nations.

An entirely opposite school has, however, stated a principle, which, though not applied by it to the question of the tenure of land, would if true be hostile to the application of further capital to the soil. Political economists (see, *e.g.*, Mill, bk. i, chap. xii.) have asserted that every successive application of capital to cultivation must be less profitable than the first. This is called the "law of diminishing production from land," and it has been said to be "the most important proposition in political economy." But the fact is that it is true only if the qualification be added "in the existing state of knowledge." That is to say, it is true that, if a given amount of labor applied in raising wheat, for example, will raise sixteen bushels on an ordinary soil, twice the amount of labor will not, *per se*, raise thirty-two bushels on the same soil, or even sixteen bushels on a very inferior soil. But chemistry and experiment tell us that if, instead of spending the second quantity of labor in merely plowing twice instead of once, we spend it in purchasing and applying nitrogen, phosphoric acid, and potash in proper proportions to the soil, either directly as artificial manures, or still more cheaply as manure from animals whose food has contained these elements, we do get a return considerably more than double for the double amount of labor which the application involves. This is exemplified in the fact that rents rose about 20 per cent. in England when these appliances came into use, in spite of a stationary range of prices, showing that the additional capital thus devoted to agriculture gave a higher return than the capital that had been previously employed.

A further illustration may be found in the fact that the capital that has been expended by the Improvement Companies in England, under the supervision of the Inclosure Commissioners, has yielded on an average a return of 15 per cent. of increased rental on the expenditure, over and above the profit made by the tenant farmer (Caird). Since this average includes a few cases in which defective knowledge has led to loss, it is evident that, when capital is applied to agriculture with reasonable scientific knowledge and skill, it is capable of still yielding returns at a full average rate, even after payment of the salaries earned by the scientific and practical education which has directed its employment. Nor is there any reason to believe that the process has come, or nearly come, to an end. It certainly does not follow that soil is capable of unlimited production; for it is quite certain that its powers in this respect are sharply defined by the amount of light and heat which in any given situation the plants growing on it can receive. But it is becoming daily more probable that up to that limit advancing science and practical skill will tend to equalize the cost of production, making the application of labor to inferior soils as profitable as to superior, and making capital as productive when approaching the limit of its useful application as when it is, in the form of rude labor, applied to soils newly brought under cultivation.

But, on the other hand, the doctrine that the land can be made more productive by the application of more capital, and that the state has a strong interest in increasing production, is fatal to all that variety of proposals which have been made for what is called, in rather uncouth and exceedingly vague phrase, "nationalization of the land." All of these start with the suggestion that the land of the country, being the property of the community, should be resumed by it for a new arrangement or distribution. In some schemes it is proposed that the state shall buy out the present owners, paying them the full value of the fee simple; in others it is proposed that the state shall simply resume the land on the death of the present owners, without paying any compensation to their heirs. Conceding the abstract justice of both propositions, it admits of little doubt that they would not be for the public benefit. Under the first the state would make a very bad bargain. Land, on account of its attractions as a subject of private property, brings a market price nearly 30 per cent. above its actual value. It sells usually at a rate computed to yield a clear return of not more than 3 per cent. But in order to bring this return the owner is obliged to lay out, in maintenance of buildings, drains, roads, fences, and other incidents, sums which on an average are not much less than a third of the net produce. If, then, the state is to buy at the rate of 3 per cent. what actually yields only 2 per cent., it is clear that the public will be a loser on the transaction. On the other hand, if the state is to take possession of land on the death of the present owners, either without compensation or with a compensation less than the market value, the result would be at once to stop all further improvement by the actual possessors. No one would spend money on that which was to pass, not to his own heirs, but to the public, and the land when it reverted to the state would be in a condition requiring enormous outlay to restore its exhausted fertility, and to remedy the general decay into which its appliances would have been suffered to fall. If again it be urged that the state might obviate this evil by offering compensation for the actual value of improvements which might be made, it can only be answered that private landlords and tenants have not yet found a method of satisfactorily ascertaining such value; that even when the principle is accepted tenants frequently prefer, when certain of not obtaining a renewal of their lease, to exhaust the land rather than trust to arbitration giving them an equivalent; and that this tendency would be enhanced when the state became the landlord and the valuers were appointed by it.

Supposing, however, the operation to be accomplished, and the state to have become the universal landowner, the next question is, What is it to do with the land? On this there is a still greater variety of suggestion. Some would have the land let by the state on lease merely, and would apply the rental to extinguish taxation. Others would have the state to sell in fee simple. But in both cases there arises the further question, To whom shall the advantage of a lease or a sale be given? Here there breaks out the dispute between the advocates of large and small estates and of large and small farms. Some would offer the priority of choice to the existing tenants; but, as this would result in the creation of a large proportion of estates or farms extending to hundreds or even thousands of acres, its superiority over the present system can only be considered as partial. Others would break up the whole land of the country into peasant properties, and even go so far as to furnish each with a house. But, considering that this scheme would further involve the abandonment of most of the existing farmhouses and farm buildings, which would be quite useless to peasant proprietors, it would impose a very heavy financial loss on the nation.

It must be further kept in view that there are only 47,000,000 of cultivable acres to be divided among 35,000,000 of persons, and that the acres are of every conceivable difference of value, dependent not merely on soil but on situation, climate, cropping, capability for improvement, and a thousand other circumstances. To divide these into plots of equal value would be a task of enormous expense, and perhaps scarcely possible to be accomplished. But, if the plots are to be of larger size and unequal value, it must be again asked, How is the state to be guided in selecting the individuals to whom its special favors are to be given? And if it be said that the state would exact a rent proportioned to the value, and thus confer no favor, there would then arise the further question whether the rent is to be fixed in perpetuity, which means a gift to the lessees of all capability of improvement in the land, or whether it is to be adjustable by valuation at intervals, which merely leaves the lessees in the same position as the present lessees are. In the latter case nothing would be gained except that some would be dispossessed in order that others might be put in possession.

It is, however, insisted that in any case the state would have the advantage of drawing the rental of the land, and it is argued that this would do no wrong to the lessees, because it would be only the rental derived from the original value of the soil, and would not affect their profits from the capital and labor they employ on it. This principle, if sound, might, however, be applied with equal force to every other species of material wealth. The state would be quite as fully entitled to acquire, by purchase or by annexation on death of the owner, factories and consols, as it is to acquire land for which it has suffered the former owner to pay a price. But there is a greater disadvantage in the state becoming the universal landlord. A farm is dependent not only on the soil but on the seasons and the markets, and its profits cannot be guaranteed. A rent for the use of the mere soil may be fair on an average of years, but occasionally there comes a series of years in which no rent at all can be paid without bankruptcy of the tenant. Private landlords can and do meet these bad times by concession and agreement, but the state can only act by laws, and in justice to the community it must be hard to its debtors. It is in fact the system which has been tried to be carried out in India, with a considerable variety of method, but with uniformity of failure—a failure to be attributed mainly to the fact that state taxation, necessarily inelastic, is disastrous when applied to income so fluctuating as that from land must be. In fact a tenant, paying full value for the unimproved land to the state, would be in precisely the position occupied at present by an owner who is mortgaged up to the ears; and, since the rent is to be in perpetuity also, he would be unable ever to redeem himself from the burden. An occupant so situated is the most unhappy of men, and the worst of cultivators, and that the state should hold the mortgage over him would only make his position the harder.

These considerations apply also to the recommendations which have been made that the land tax should be increased and that the "unearned increment in the value of land" should be appropriated by the state. Including tithe and local rates, land is taxed at present to an average of about 30 per cent. on its net profits. An additional tax on land would operate to prevent investment of capital on its improvement, since capital will not be invested where its returns are below the average. The "unearned increment in value of land" is often strikingly apparent in and near towns; but it does not exist in the bulk of agricultural districts. Corn has not risen in price within the last hundred years, and, if meat has, so has the cost of raising and importing the food of cattle. The rise in the value of agricultural land generally is not on the whole more than a fair return for the capital that has been invested in improvements, and for the immense sums that have been lost in the experiments out of which the improvements have sprung. The cases in which it is more than this would be incapable of being discriminated, and would not be worth the trouble if it were possible. The idea would probably not have been started had it not been for the spectacle of the enormous fortunes accruing to those who have had the good luck to inherit or to purchase land useful for building purposes. If limited to such cases, the principle of the right of the community to resume the benefit arising from its own concentration in particular spots may be supported by different and very good reasons, due regard being had to the reimbursement to the private owner of all sums actually expended by him in purchase or building.

The right of the public to mineral wealth under the soil stands on as clear a footing. By the common law gold and silver mines belong to the crown, no matter who is the owner of the soil. The principle obviously applies equally to all minerals. They are a part of the country itself, not merely material from which profit can be extracted, and when they are gone they cannot be replaced. As the law forbids the selling of land to foreigners, it might with equal justice forbid the selling of coal for foreign exportation. The discovery of valuable minerals is often due to mere accident, and they resemble treasure-trove, which by law belongs to the crown. Nor would difficulty arise in working mines by crown lessees or under crown superintendence. Where they already are worked it would be right to pay the estimated value to the private owner, since hitherto they have been deemed subject of private property, but all future increase or all new discoveries might justly be held to belong to the nation, without compensation to the owner of the surface who had no knowledge of their existence.

Approaching now the question how the state without actual resumption of the land may so regulate its possession as to encourage the maximum production from it, we are in the beginning met with the dispute between the advocates of large and small estates, the former cultivated by tenants, the latter by the owners. But we may first disembarrass this question from one source of confusion. Large estates are never cultivated in a block. They are invariably broken up into farms, sometimes indeed extending to several thousand acres, but far more generally ranging between the limits of 500 and 50 acres. Below 100 acres the tenant is usually himself the cultivator, with more or less assistance, and below 50 acres he will seldom require any assistance outside his own family. Now, as there is no advantage accruing from one landlord holding a number of such farms, we may state the question as regards cultivation as not being between large and small estates, but as being between farms of which the tenant does the work and those in which he only superintends the work of others.

Thus stated, the answer admits of no dispute. It has been already discussed in the article AGRICULTURE; but it may suffice to advert here to the conclusive argument derived from the superior efficacy and therefore cheapness and productiveness of the labor given by a man in working entirely for his own behoof, as compared with that which he pays others to do for him. It would scarcely be too much to say that capital in the form of personal labor will yield twice the return of capital employed in hired labor. It applies not merely to the man but to his wife, sons, and daughters, and not only to the actual amount of work done, but to the zeal and care with which it is directed.

Against this advantage on the part of the small cultivator there is only to be set in favor of the large that he can better employ machinery. But, though he may be the first, he is not necessarily the only one to employ machinery. Reaping and mowing machines may be (and often are) employed on the smallest holdings; thrashing machines are now made to be worked by hand or by one or two horses; even steam-engines are made with power down to one horse or half a horse. These very small machines are slightly more wasteful of coal for the power they give out; but on a small scale this is quite inappreciable, and is far more than balanced by the greater economy induced by their being driven by the owner himself. A very elementary resort to combination among small cultivators affords them in any case the same advantages as the large cultivator. Their energy and aptitude are not less, and with the advance of education may be directed with the same knowledge. Most persons connected with land know of many instances in which even at present the small cultivator is as advanced in his scientific practice as the larger. It is generally admitted that during a recent disastrous season the smaller farmers were better able to meet their engagements than the larger. The reason is, not merely that their outlay was smaller in cost of labor, but that by close attention and the power of availing themselves of every opportunity they have suffered less actual loss than the farmer on a more extensive scale.

It is of course understood that, to enable a farmer of a small acreage to produce the same result as a larger holder, he must have the same advantages provided to him by investment of owner's capital. He needs the same buildings for farm purposes, the same drains and fences, in proportion to his extent of farm. But he does not need more, and, as his own house is only an equivalent for the laborer's cottage, which must in any case be provided, there is the saving of the more expensive residence which a farmer cultivating several hundred acres thinks himself entitled to. Again, the tenant's capital invested must also be as much in the one case as in the other. The small tenant ought to have as much and as good stock on the farm in proportion to its extent as the large. But he saves much capital in the item of wages, because, till profits come in, his own labor costs him only his own food, and even the rent of his house is postponed, so that it is probable that he will be able to spend on the land a capital larger in proportion than the extensive farmer at a greatly less actual outlay of money. Those who argue that the capital invested by the larger tenants is greater than that invested by the small cultivator forget that capital in agriculture must be measured not solely by expenditure of money, but in a great measure by expenditure of labor, to which a whole family may cheaply but effectively contribute.

The importance of encouraging investment of capital forms perhaps the main argument in favor of the system of cultivation by the joint interests of landlord and tenant. In this combination the landlord furnishes the land and (in Scotland always, in England frequently) the buildings, etc. The tenant's capital is therefore limited in its application to operations of tillage and manuring. The landlord's contribution is commonly estimated at five-sixths, the tenant's at one-sixth of the total capital employed, and while the landlord's yields less than 3 per cent. interest, the tenant's has, by Mr. Caird, been estimated as bringing in 10 per cent. per annum. This, however, on an average of years and of farmers is probably too high an estimate. The conclusion, however, is drawn that the system is beneficial to the farmer because the capital required for permanent investment is advanced by the landlord at a low rate of interest, while the whole of the tenant's capital is invested at a high rate of interest. But in this argument it seems to be forgotten that the tenant's 10 per cent. includes not merely interest on capital subject to risk, but salary for time and skill, and is, therefore, not really 10 per cent. on capital. Now, undoubtedly, if anyone desires to risk his whole capital in trade, he is entitled to at least 10 per cent. on it, and he makes, while prosperous, a large income. But if he prefers to invest five-sixths of it in a secure investment, yielding only 3 per cent., and to risk only one-sixth, while at the same time giving his personal labor and skill, his income may be considerably smaller, but it will be to the same extent the more secure. It is entirely a question for each person to solve for himself, and it would be no national loss if a certain number of farmers were to elect to purchase farms of only one-sixth the extent of those which they occupy as tenants, and to cultivate them with their own labor. Or, if the present tenants should be reluctant to exchange their higher incomes, subject to the greater risk, for smaller but more secure incomes, it cannot be said that there is any national gain in their occupying land which in the hands of small owners would yield crops as large and at no greater cost, though with a different distribution of profits

What is true in the argument appears to be this. It would be a distinct loss to the nation if landlords were to withdraw their capital from the land before other persons are prepared to put as much in. At present tenants in general cannot put in more capital, because they have not got more. They could not, therefore, buy their present farms. But they could buy farms of smaller extent and on these raise crops fully as good. And if there were enough of other persons prepared to buy the remainder of the land, and to cultivate it themselves with equal skill, there would be equal advantage in their doing so. But, since skill in farming needs both education and practice, there are not enough of persons as yet possessed of these qualifications and also of the needful capital. Hence any sudden break in the present system of tenure by landlord and tenant would be hurtful to the country, leading to abstraction of capital, and worse cultivation and less produce. But a gradual process of change, permitting all persons who had capital (however small) and aptitude to become owners and cultivators, would be a national benefit, since it would not diminish the capital employed, but would render it on the contrary more productive through the stimulus of being applied wholly for the benefit of the cultivator himself.

There is no doubt that the system of division of capital and rights between landlord and tenant is intrinsically bad. Neither is full owner, nor can do even with his own share exactly what is best for himself and the public. The landlord is generally short of means with which to make permanent improvements; in any case he can make none without the tenant's sanction, and of course he makes none unless the tenant agress to pay him at least 3 but more often 5 per cent. The tenant, on the other hand, having only a temporary interest, spends nothing except when he sees a certainty of being repaid before the end of his term. Land, however, yields only slow returns, and much is thus left undone because the full profit cannot be reaped till after a lapse of years. The system of leases, universal in Scotland, palliates but does not remedy the mischief. It is recognized that the tenancy, usually of nineteen years, is in practice divided into three equal portions. The first is spent in restoring the exhaustion of the soil by the preceding tenant, the second gives a full profit, the third is (if no renewal of lease be expected) devoted to the gradual withdrawal of capital, with corresponding reduction of fertility. Compensation for unexhausted outlay is an excellent principle; but it has not yet been found so trustworthy in application as to afford sufficient security to induce the continuous application of capital till the end of the lease. It is very doubtful whether any form of legislative interference, passing beyond a mere enactment of equitable presumptions in absence of express contract, would improve the relation between the two parties, because such enactments when not agreeable to both parties can always be indirectly broken through. It is only cultivation by the actual owners that gives at once the freedom and security necessary for full development of the capacity of the land and the adoption of the results of modern science.

The history of land tenure in Ireland illustrates these principles, and they in turn afford a standard by which to judge recent legislation. Leaving out of view a certain number of estates on which the landlord supplied, in addition to the land, the capital represented by buildings, drains, etc., in the greater part of Ireland he supplied nothing. The tenant, under a general custom of permanence of holding, in many cases did a great deal; but, as the custom was not enforced by law, the occasional seizure of his improvements caused a sentiment of alarm and distrust which seriously limited them. The act of 1870 aimed at giving him additional security by not merely recognizing his right to compensation for his own outlay if he should be removed, but by imposing a fine on the landlord if he should evict a tenant. But, as it avoided to prohibit the landlord from raising the rent, the insecurity was just as great as before, while the introduction of a legal relation between the two parties led many landlords to restrict more than ever their expenditure on improvements. The act of 1881, therefore, proceeded to the necessary consequence of fixing the rent, by means of a court of valuation, and of giving to the tenant a positive right to permanent occupancy, subject to a revaluation every fifteen years. But it is obvious that this scheme also, though valuable as an immediate palliative, fails to have the elements of a permanent settlement. The landlord will be less and less inclined to spend on improvements; and even if he desired to do so the tenant can, and in nearly every case will, prevent him, for the plain reason that he will not desire the landlord's share in the joint property to be increased. Yet the tenant will on his part be impeded from full confidence in making improvements, even when he has the means, lest at the next valuation his own outlay may be valued against him. The interests are no longer joint but conflicting. Thus far the remedial legislation has only succeeded in reaching the stage in which Prussia stood before the reforms of Stein and Hardenberg were proposed, when nobles and serfs had both certain legal rights, which neither could attack, but which neither could convert into independent property. But the Prussian method of reform by apportioning the land to each party in absolute property, but in fractions representing their respective interests, could not be applied in Ireland, both because the holdings are in general too small to bear partition, and because the landlords have not, as in Prussia, been in the habit of cultivating their own domain, and they would, therefore, again introduce the vicious system of letting to tenants even that part which might be assigned to them in unincumbered fee. The state will, therefore, have to become the intermediary of transfer, but the better course would probably have been that it should at the first have assumed this function on the over-rented and ill-managed estates, leaving those which were fairly rented and liberally managed unaffected by legislation which they did not need.

The legal basis of the recent land legislation in Ireland is, however, as it was in Prussia, the recognition that prescriptive possesion, even under a title of mere tenancy, confers a right to continuance of such possession. The same principle formed the basis of the conversion of copyholds in England from being tenancies at will into tenancies in perpetuity. It might justly be applied still in cases in Great Britain in which tenancies have continued without change for a long period. Especially it might be applied to check the system of "clearances" in the Highlands, where the right of the crofters to continue in possession rests on the original community of possession by the tribe, and is fortified by an almost immemorial continuance of possession by each family.

In any view of ownership, however, whether on a large or small scale, it is obviously of prime importance that the owner should be possessed of cash sufficient to make the improvements required. This is a situation in which an owner who is already in debt cannot possibly be. To hold land subject to a mortgage is, therefore, to hold it under conditions disadvantageous to the owner, the tenant, and the nation. The evil is intensified by the fact that an owner so burdened possesses an apparent estate far in excess of his real means, and occupies a social station involving an expenditure that exhausts his resources in every way. It would be greatly for his pecuniary advantage if the law were such as would compel him to sell sufficient land to pay off his debts, for he would thus relieve himself of interest at the rate of 4 to 5 per cent. by selling property which gives only 2 or 2½ per cent. on the price that would be obtained. His net income would then not only be greater, but as his apparent estate would be smaller he would not be tempted to live in so expensive a style, and he would thus have the means of gaining larger returns from his property by improving it. It has, therefore, been proposed to abolish mortgages by phohibiting land from being made security for special debts. It would then form part of the general assets of the owner, liable equally for all his debts; and anyone who desired to raise money would practically be obliged to do it by sale instead of by pledge. Land would be confined to its proper purpose as a means of production, instead of being injured for that purpose by being used as a means of credit.

The same principle forbids that life interests in land should be permitted. The mere tenant for life or holder under settlement or entail has actually in frequent instances a motive against cultivating his estate to the best advantage. If he is not on good terms with the next in succession, or if, as so often happens, the next successor is a distant relative, while present tenant has only daughters, his motive and often indeed his duty, must be to impoverish the estate in order to save money for those whom he loves best. In a less degree, if he has a large family, he must save money out of the rents of the estate to provide for his younger children, and he is correspondingly disinclined to lay out money on improvements which must accrue only to the benefit of his eldest son.

All these considerations are equally applicable to small as to large estates in land. It is as injurious to the peasant cultivator as to the extensive landowner to be hampered by a burden of debt, or to be deprived of the power of directing who shall be his successor. In France, in Germany, in Switzerland, in America, and in India, indebtedness is the great curse of the small farmer. The money-lender is a far harder master than the landlord, for he has less mercy and less interest in being merciful.

It has been assumed throughout these observations that land is to be applied to its natural use, the production of the materials of food and clothing. In the hands of rich persons it is, however, sometimes devoted to purposes of luxury and enjoyment, such as the formation of large parks, game preserves, and deer forests. Within moderate limits such purposes may be defended on the plea that man does not live by bread alone but by all the enjoyments which he is framed for appreciating, and which in moderation contribute to mental health. But they are most defensible when open to the most general enjoyment, and it is peculiarly to the credit of many of the English nobility that they open their parks to the resort of the neighboring villagers and townspeople, often at some inconvenience to the owners themselves. On the other hand, the conversion of large tracts of ground to the object of preserving game, which implies at the same time exclusion of the public, and diminution of production of food, for the sole recreation of one or two individuals, is a use of national resources which has, since the formation of the New Forest by William the Conqueror, been generally reprobated. The latest phase of its development has been in the conversion of immense areas of the Highlands of Scotland into grouse shootings and deer forests, a process which involves the removal of the small tenantry, and, even in the case of deer forests, the ceasing to graze cattle and sheep. The landowners find that the game rents are much more profitable to them than the farming rents, but it is at the cost of the nation, which suffers a diminution in the employment of labor and in the production of food, and which consequently must see its inhabitants emigrate and pay for imported grain, wool, and meat grown by foreign labor. The ultimate remedy of this abuse will probably be found in measures tending to break up large estates into small ones, for the system requires the reservation of extensive areas free from the presence of man, and the interposition of small cultivated holdings would effectually destroy it.

It may, however, be well to notice here an argument which has been sometimes pushed to excess. It has been urged that even grazing should be prohibited on the ground that from the same area a much larger production of food can be obtained in the shape of corn than of meat. The difference is indeed very striking. An acre of good land will yield forty bushels of wheat, weighing 2,500 pounds, while in grass it would yield only 250 pounds of meat, and it is still more striking if we deduct the water from each, when we have 2,200 pounds of dry grain against 188 pounds of dry flesh and fat. But man, being semi-carnivorous, must have a proportion of flesh, and the value he assigns to meat as compared with corn shows very correctly its relative importance in the human economy. The fact is that the test of market prices, which are now regulated by the production and demand of the whole world, assigns to dry meat and fat a value just about twelve times as great as that of corn, and consequently an acre of grass land gives a profit quite equal to that of an acre of wheat. Nor could the equality be impaired even if we were all to become vegetarians. For the most ardent disciples of that faith admit the necessity of using milk, and about two pints of milk is a necessary addition to a daily allowance of two pounds of grain for health and the performance of work. But to furnish this quantity of milk throughout the year nearly an acre of ordinary land would be required, or as much as would give about half a pound of meat per day, so that there are no means by which we can dispense with the use of a considerable extent of land for the feeding of animals, by which its produce is converted into the proximate products demanded by the human constitution; and the amount to be so used is best determined by the demand of the public.

The conclusion to be drawn from the review of the whole question relating to tenure of land is that they are best solved by freedom of action of individual owners, guided by self-interest and family affection, and only restrained by law when the special circumstances of a high civilization introduce abnormal conditions. Since these motives operate most fully and healthily when land is held in small estates, it only remains to glance at the methods which in different countries and by different authorities have been suggested to encourage subdivision.

The most general method is that of equal division of the inheritance among children. It is compulsory in the Channel Islands, in France, and several other European countries, and it forms the rule of intestacy under the law of gavelkind in Kent, in most of the British colonies, and in the United States. To its existence in the latter form no reasonable objections can be taken. To its compulsory enforcement there applies, though in a modified degree, the same objections that apply to a compulsory rule of primogeniture, with the additional objection that it tends to limit the growth of population. Parents who are compelled to give an equal portion to every child avoid the risk of subdivision by not having many children, a course which, if commendable when the Old World seemed in peril of over-population, is a source of national impoverishment when the world affords profitable employment for hundreds of millions more than exist. Among the children themselves the certainty of succession abates the sentiment of filial duty, and the desire to bestow a special bounty on one child who is favored above the rest may sometimes induce the parents to spend less than they otherwise would in the improvement of the whole estate.

Subdivision of property may, however, be gradually effected by prohibiting excessive bequests. It has always been recognized that the state has an unquestionable right to deal with property at the moment of its transmission from the dead to the living, and no objection could be made to a rule that no one should leave by will or through intestacy more than a certain sum, or land of equivalent value, to one individual. This would not generally affect the desire during life to amass and improve property, because the improved value would still be available for division among all whom the owner wished to benefit. But it would in one generation reduce all estates of abnormal size to properties of such dimension as in the opinion of parliament would be most serviceable for cultivation, and consequently most inducive to national benefit.

The abolition of the right to raise money by mortgage of land would also tend to promote its subdivision, since an owner in debt would be obliged to sell a portion of his estate in order to pay his debts. The improvement of conveyancing, which would follow from the general abolition of all interests in land except that of simple and absolute ownership, would also facilitate the sale of land. The leading principle which should guide legislation is in short that land should be made capable of the easiest transmission from one owner to another, and of the fullest use by him to whom for the time it belongs. The ordinary motives of human nature will then concur in transferring it from those who are least to those who are most capable of making it productive, and of inducing each successive owner to bestow on it the labor and outlay by which the maximum of beneficial production will be secured.

There have been many theories and much agitation of late years on the subject of land tenure in the United States, the most notable among the plans advanced being that of Henry George, the modern apostle of Labor Economics.

LANDAU, the chief town of an official district in the palatinate of the Rhine, Bavaria, is situated on the Queich, about eighteen miles northwest of Carlsruhe.

LANDEN, JOHN, a distinguished mathematician of the eighteenth century, was born at Peakirk near Peterborough in Northamptonshire in 1719, and died January 15, 1790, at Milton, in the same county.

LANDER, RICHARD (1804–1834) and JOHN (1807–1839), two brothers, African explorers, were natives of Cornwall. Richard Lander accompanied the Niger expedition of 1825–27 as Clapperton's attendant, and on the death of his master at Sokoto on the Niger in April, 1827, returned to England, and published an account of the expedition in 1830. He exhibited such capacity for the work of African exploration that the British Government decided to send him out to determine the course of the lower Niger, which was then unknown. In the expedition he was accompanied by his brother John, who was better educated than Richard, and who went as an unsalaried volunteer. Leaving England in January, 1830, the brothers landed at Badagry on the Guinea coast on March 22d. They then traveled northeast to Boosa on the Niger, and after a trip north as far as Yaoorie they proceeded down the river in canoes. The Landers were thus able to lay down with approximate correctness the lower course of the Niger, and to prove that it discharged by a delta into the Gulf of Guinea. They lost many of their records at Kirree, but published a detailed narrative of their exploration in three volumes, in 1832 (*Journal of an Expedition to Explore the Course and Termination of the Niger*, by John and Richard Lander). In 1832 Richard went out again at the head of a well-equipped expedition, organized by Liverpool merchants for the purpose of opening up trade in the Niger, and founding a commercial settlement at the junction of the Binué with the main river. After making several successful journeys, he was again on his way up the river in January, 1834, when on the 20th the party were attacked by natives, and Lander was wounded. He died of his wounds at Fernando Po on February 6th. John Lander died November 16, 1839.

LANDES, a department in the southwest of France, formed of portions of the ancient provinces of Guyenne, Béarn, and Gascony, is bounded on the north by Gironde; on the east by Lot-et-Garonne and Gers; on the south by the Basses Pyrenées; and on the west (for sixty-eight miles) by the Bay of Biscay. The department takes its name from the *landes*, sandy plains formerly covered by the sea, which occupy its greatest portion, and extend into the departments of Gironde and Lot-et-Garonne. The soil of this plain is naturally sterile. It is composed of a mixture of sand, clay, and organic debris, and rests on a subsoil of tufa (*alios*) which is impermeable to water; for three-quarters of the year, consequently, the waters, settling on the almost level surface and unable to filter through, transform the country into marshes and morasses, while in summer the heat of the sun, drying up the marshes, produces malarious fevers. The coast, for a breadth of about four miles, is bordered by a succession of dunes or sandhills, in several ranges parallel to the shore, and from 150 to 300 feet in height. Driven by the west wind, which is most frequent in these parts, the dunes were slowly advancing year by year toward the east, burying the cultivated lands and even the houses. Bremontier, toward the end of the last century, devised the plan of arresting this scourge by planting the dunes with maritime pines. At the present time upward of 98,000 acres have been thus treated, and the forests already supply some fine timber to the navy. Most of the department is still in the condition of *landes*, traversed by flocks of sheep, which are kept by shepherds perched upon stilts. In the *Chalosse*, the richest portion of the department, the vine, maize, wheat, millet, tobacco, vegetables, hemp, and flax are cultivated; yet, small though the population is, the department does not produce corn enough for its own consumption. The exploitation of the forests forms the chief industry. The population of Landes in 1901 was 291,657, or eighty-one inhabitants to the square mile. Mont-de-Marsan is the capital of the department.

LANDLORD AND TENANT. It has been explained in the article LAND that in Great Britain no such thing as the absolute private ownership of land is recognized. The absolute and ultimate owner of all lands is the crown, and the highest interest that a subject can hold therein is a tenancy. The largest estate known to the law, that in fee simple, is after all only a holding in which the owner of the fee stands to the lord in the relation of a tenant. All estates in land would therefore fall under this heading, but on the present occasion, as in common parlance, it is restricted to those holdings which amount to the hiring of land. That tenure has nowhere the same importance as in the British Isles, where practically the whole agricultural land of the community is cultivated by persons who merely hire it for a limited time from the owners.

Dismissing the tenant character of the landlord, and regarding him as owner pure and simple, we have to deal with him as contracting to give up the occupation of his land to another person, the tenant, for a consideration. In Roman law, the tenure of *emphyteusis* (a kind of perpetual lease originally used by corporations but afterward by private owners), and *precarium* (or tenancy-at-will) occupied to some extent the place of the law of landlord and tenant in our system. The proper contract of letting and hiring (*locatio-conductio*) as applied to land had the following incidents:—The *conductor* (tenant) was not technically regarded as possessor; *i.e.*, he had not the aid of the interdicts in case of eviction either by the landlord or by strangers. The *locator* alone could sue in respect of the land, but the conductor had a personal action against the locator on the contract. The landlord was bound to make delivery to the tenant and permit him to occupy for the term agreed upon, and to keep the premises in proper repair. The landlord was answerable for any injury arising to the tenant from the defective condition of the premises. Finally, " the landlord must permit the tenant to carry away not only movables but even fixtures placed by the tenant, provided the tenant did not injure the house. A tenant of land was entitled to compensation for unexhausted improvements except such as he had specially agreed to execute in consideration of a lower rent." On the other hand, the conductor had to pay the rent subject to deductions for the total or partial loss of the crops, to exercise due care during his term, and give up possession at its expiration.

In English law the following terms are of fundamental importance:—The landlord so contracting is said to *demise* his lands, and the instrument by which the contract is expressed would be a *demise* or *lease*. The word lease is very generally limited to the writing in which the agreement to let is expressed, but any contract of letting is as on the side of the landlord a *demise*, and as between the parties a *lease*. A lease or demise means a grant of the exclusive possession of the thing in question for a definite time; permission merely to use the thing for a particular purpose or on a particular occasion is a license and not a lease. A lease further implies that the lessor intends to give up possession to the defendant for a determinate time, no matter how it may be expressed, and is so distinguishable from a mere agreement contemplating that the parties shall on some future occasion enter into the relations which a lease creates. The consideration promised by the tenant or lessee is termed the *rent*. The period of occupation prescribed is the *term*.

A lease, like other written contracts, should clearly indicate the parties to and the effect of the contract. A date is not necessary, and, in the absence of a date, it will take effect from the day of delivery. But it must contain the names or other sufficient description of the parties, a description of the premises to be demised, words appropriately expressing the fact of a present demise (*demise* or *lease* being the usual words), the date at which the term is to begin and end, and the rent. The rent or other services created in favor of the landlord by the lease are said to be *reserved*. And when things that would otherwise belong to the tenant under the lease, as woods, timber, trees, minerals, etc., are expressly withheld, they are said to be *excepted*. But these expressions do not apply to conditions giving to the landlord the right of shooting, fishing, and so on over the land, or any right of way or other easement thereon. That can be vested in the landlord only by a re-grant from the tenant, no matter by what expression the right is created. Such grant must be by deed; and, where a lease of the land would be effectual without a deed, a reservation of such rights as we have mentioned would not.

In point of length of term tenancies are distinguishable as being either at sufferance, or at will, or from year to year, or for a term of years. A tenancy by sufferance exists where a person having obtained possession on a lawful title holds over after the title has determined, *e.g.*, a tenant on lease for a term of years after the expiration of the lease. It has been said that this is not an estate at all, but a fiction to prevent the continued possession being regarded as a trespass. It is not created by contract, but arises by implication of law; it is not assignable; and possession of the land can be resumed without previous demand to the so-called tenant. A tenancy-at-will exists when the tenant holds by agreement with the landlord, determinable at the will of either. Any signification of a desire to terminate the tenancy, whether expressed as "notice" or not, will bring it to an end. A tenancy from year to year is a tenancy for one year certain, and is determinable only by a six months' notice to quit, such notice terminating on an anniversary of the date of the beginning of the tenancy. A tenancy from year to year must last at least one year, but may be determined then, if a six months' notice have been given; if not so determined it must endure for another year, again determinable in like manner, and it will so endure until terminated by such a notice. Apart from express agreement, it will be implied in law when, for example, the landlord accepts rent yearly or by parts (*e.g.*, quarters) of a year. Similarly monthly tenancies, chiefly of furnished houses or lodgings, would be implied from the fact of rent being paid once a month. But that is a matter of presumption only. If it were proved that the parties agreed to a tenancy-at-will only, payment of rent by the quarter or any other period would not enlarge the nature of the tenancy. Lastly, a lease may be for a specified term, and the tenancy in that case comes to an end by the lapse of time, without notice to quit or any other formality.

These are the agreements by which the relations of landlord and tenant, as the phrase is generally understood, are created, and they are the agreements under which most of the buildings and nearly the whole of the agricultural land are held by their occupiers. There are tenancies, however, in which the grantor would not be spoken of as the landlord. Such is the position of the person to whom land is granted for his own life, or, it may be, for the life of another, called, in technical language, tenant for life and tenant *pur autre vie*. These are not cases of letting and hiring—to which the relation of landlord and tenant is confined—but are modes of holding property. The same may be said of the terms for long periods of years created for carrying out trusts in the settlement of estates. The tenant, in such cases, is the person who, when we come to the agreement of letting and hiring, stands in the place of the landlord. It may be observed that the law books distinguish in point of dignity between estates for life, the lowest kind of freehold estates, and estates for any term of years, however long, which are only leasehold estates.

The legal rights and duties of landlord and tenant, respectively, are in most cases defined by the contract of tenancy. The policy of the law has hitherto been to allow the landlord, who is virtually, if not technically, absolute owner of the land, to do as he pleases with it. The contract of tenancy has hitherto been a free contract, and, although in the absence of contract, the law itself defines the rights of the parties, there is hardly one of these which may not be displaced or modified by the agreement. The general status of landlord and tenant in the United States is about the same as that heretofore recounted, the enactments on the subjects in the various states being founded on English law.

LANDON, Charles Paul, French painter and art-author, was born at Nonant in 1760, and died in 1826.

LANDON, Letitia Elizabeth, a writer of poetry and fiction, better known by her initials L. E. L. than as Miss Landon or Mrs. Maclean, was descended from an old Herefordshire family, and was born at Chelsea, August 14, 1802. In June, 1838, she married George Maclean, governor of Cape Coast Castle, but she only survived her marriage a few months, dying from an overdose of prussic acid, which, it is supposed, was taken accidentally.

LANDOR, Walter Savage, born at Warwick, January 30, 1775, died at Florence, September 17, 1864. In the course of this long life he had won for himself such a double crown of glory in verse and in prose as has been won by no other Englishman but Milton. And with that special object of his lifelong veneration he had likewise in common other claims upon our reverence to which no third competitor among English poets can equally pretend. He had the same constancy to the same principles, the same devotion to the same ideal of civic and heroic life; the same love, the same loyalty, the same wrath, scorn, and hatred, for the same several objects respectively; the same affection and kinship to the spirit of the Romans, the same natural enjoyment and mastery of their tongue. Not accident merely but attraction must in any case have drawn them to enlist in the ranks and serve under the standard of the ancient Latin army of patriots and poets. But to Landor even more than to Milton the service of the Roman Muse was a natural and necessary expression of his genius, a spontaneous and just direction of its full and exuberant forces. At the age of twenty he published an eloquent and elegant vindication of her claims upon the service and devotion of modern writers—the first sketch or suggestion of a longer essay, to be published in its final form just fifty-two years later. In 1795 appeared in a small volume, divided into three books, *The Poems of Walter Savage Landor*, and, in pamphlet form of nineteen pages, an anonymous *Moral Epistle, respectfully dedicated to Earl Stanhope.* No poet at the age of twenty ever had more vigor of style and fluency of verse; nor perhaps has any ever shown such masterly command of epigram and satire, made vivid and vital by the purest enthusiasm and most generous indignation. Three years later appeared the first edition of the first great work which was to inscribe his name forever among the great names in English poetry.

The second edition of *Gebir* appeared in 1803, with a text corrected of grave errors and improved by magnificent additions. About the same time the whole poem was also published in a Latin form, which for might and melody of line, for power and perfection of language, must always dispute the palm of precedence with the English version. In 1808, under an impulse not less heroic than that which was afterward to lead Byron to a glorious death in redemption of Greece and his own good fame, Landor, then aged thirty-three, left England for Spain as a volunteer to serve in the national army against Napoleon at the head of a regiment raised and supported at his sole expense. After some three months' campaigning came the affair of Cintra and its disasters; "his troop," in the words of his biographer, "dispersed or melted away, and he came back to England in as great a hurry as he had left it," but bringing with him the honorable recollection of a brave design unselfishly attempted, and the material in his memory for the sublimest poem published in our language between the last masterpiece of Milton and the first masterpiece of Shelley—one equally worthy to stand unchallenged beside either for poetic perfection as well as moral majesty—the lofty tragedy of *Count Julian*, which appeared in 1812, without the name of its author. No comparable work is to be found in English poetry between the date of *Samson Agonistes* and the date of *Prometheus Unbound*; and with both these great works it has some points of greatness in common. The superhuman isolation of agony and endurance which encircles and exalts the hero is in each case expressed with equally appropriate magnificence of effect. The style of *Count Julian*, if somewhat deficient in dramatic ease and the fluency of natural dialogue, has such might and purity and majesty of speech as elsewhere we find only in Milton so long and so steadily sustained.

In May, 1811, Landor had suddenly married Miss Julia Thuillier, with whose looks he had fallen in love at first sight in a ball-room at Bath; and in June they settled for awhile at Llanthony Abbey in Wales, from where he was worried in three years' time by the combined vexation of neighbors and tenants, lawyers and lord-lieutenants; not before much toil and money had been nobly wasted on attempts to improve the sterility of the land, to relieve the wretchedness and raise the condition of the peasantry. He left England for France at first, but after a brief residence at Tours took up his abode for three years at Como; "and three more wandering years he passed," says his biographer, "between Pisa and Pistoja, before he pitched his tent in Florence in 1821." In 1824 appeared the first series of his *Imaginary Conversations*, in 1826 "the second edition, corrected and enlarged;" a supplementary third volume was added in 1828; and in 1829 the second series was given to the world. Not until 1846 was a fresh installment added, in the second volume of his collected and selected works. During the interval he had published his three other most famous and greatest books in prose: *The Citation and Examination of William Shakespeare*, 1834; *Pericles and Aspasia*, 1836; *The Pentameron*, 1837. To the last of these was originally appended *The Pentalogia*, containing five of the very finest among his shorter studies in dramatic poetry. In 1847 he published his most important Latin work, *Poemata et Inscriptiones*, comprising, with large additions, the main contents of two former volumes of idyllic, satiric, elegiac, and lyric verse; and in the same golden year of his poetic life appeared the very crown and flower of its manifold labors, *The Hellenics of Walter Savage Landor*, enlarged and completed. In 1853 he put forth *The Last Fruit off an Old Tree*, containing fresh conversations, critical and controversial essays, miscellaneous epigrams, lyrics, and occasional poems of various kinds and merit, closing with *Five Scenes* on the martyrdom of Beatrice Cenci, unsurpassed even by their author himself for noble and heroic pathos, for subtle and genial, tragic and profound, ardent and compassionate insight into character, with consummate mastery of dramatic and spiritual truth. In 1856 he published *Antony and Octavius—Scenes for the Study*, twelve consecutive poems in dialogue which alone would suffice to place him high among the few great masters of historic drama. In 1858 appeared a metrical miscellany bearing the title of *Dry Sticks Fagoted by W. S. Landor*, and containing among other things graver and lighter certain epigrammatic and satirical attacks which reinvolved him in the troubles of an action for libel; and in July of the same year he returned for the last six years of his life to Italy, which he had left for England in 1835. Embittered and distracted by domestic dissensions, if brightened and relieved by the affection and veneration of friends and strangers, this final period of his troubled and splendid career came at last to a quiet end on September 17, 1864. In the preceding year he had published a last volume of *Heroic Idyls, with additional poems*, English and Latin—the better part of them well worthy to be indeed the "last fruit" of a genius which after a life of eighty-eight years had lost nothing of its majestic and pathetic power, its exquisite and exalted loveliness.

LANDSBERG-AN-DER-WARTHE, chief town of a circle in the government district of Frankfort, in the province of Brandenburg, Prussia, is situated at the confluence of the Warthe and Kladow, eighty miles northeast of Berlin by rail. In 1900 its population was about 35,000.

LANDSEER, SIR EDWIN HENRY, third son of John Landseer, A.R.A., a well-known engraver and able writer on art, was born in London, March 7, 1802. Edwin Henry Landseer began his artistic education under his father so successfully that in his fifth year he drew fairly well, and was acquainted with animal characters and passions. Etchings of his, at South Kensington, dated by his father, attest that he drew excellently at eight years of age; at ten he was an admirable draughtsman, and his etchings show considerable sense of humor. At thirteen he drew a majestic St. Bernard dog so finely that his brother Thomas engraved and published the work. At this date (1815) he sent two pictures to the Academy, and was described in the catalogue as "Master E. Landseer, 33 Foley street." Youth forbade his being reckoned as an artist in full, and caused him to be considered as the "Honorary Exhibitor" of "No. 443, *Portrait of a Mule*," and "No. 584, *Portraits of a Pointer Bitch and Puppy*." Adopting the advice of Haydon, whose pupil he was not otherwise, he studied the Elgin marbles, the "Wild Beasts" in the Tower and Exeter 'Change, and dissected every animal whose carcass he could obtain. In 1816, in which year he exhibited with the Society of Painters in Oil and Water Colors, Landseer was admitted a student of the Royal Academy. In 1817 he sent to the Academy a portrait of Old Brutus, a much-favored dog, which as well as his son, another Brutus, often appeared in subsequent pictures. Even at this date Landseer enjoyed considerable reputation, and had more work than he could readily perform, because his renown had been zealously fostered by his father in Elmes' *Annals of Art*. At the Academy he was a diligent student and a favorite of Fuseli's, who would look about the crowded antique school and ask, "Where is my little *dog* boy?"

In 1818 Landseer exhibited at Spring Gardens *Fighting Dogs Getting Wind*, a picture from which his future might have been predicted. The sale of this work to Sir G. Beaumont vastly enhanced the fame of the painter, who became "the fashion" in a way disclosed by Haydon's account of his own and Wilkie's positions under similar circumstances nearly at the same date. This picture is now at Coleorton, and it illustrates the culmination of the studies of Landseer's youth and the prime strength of his earlier style. Unlike the productions of his later life this masterpiece of his boyhood exhibits not an iota of sentiment; but it is, in its way, a proof of astonishing vigor in design, and richer in animal character than anything produced since the death of Snyders. Looking at the work as a whole, and valuing it on technical grounds, the critic feels that Landseer never produced anything better or so manly. On this level he stood until 1824, when he removed from his father's residence, and set up for himself in the house No. 1 (afterward 18) St. John's Wood Road, where he lived nearly fifty years, and in which he died. In 1818 it was little more than a cottage, with a barn attached, which was converted into a studio. Between 1818 and 1825 Landseer did a great deal of work, but on the whole gained little besides facility for technical expression, a greater zest for humor, and a larger style. The work of this stage ended with the production of Lord Essex's painting called the *Cat's Paw*, which is well known by an engraving. It was the price of this picture, £100, that enabled Landseer to set up for himself. He had to borrow a second hundred pounds to pay a premium for the house, and repaid this sum by £20 at a time. Between 1818 and 1825 Landseer's pictures were such as proved the severity of his studies; among them the principal were the *Cat Disturbed*, which was lately in the possession of Sir P. de Malpas Grey Egerton; *Alpine Mastiffs Reanimating a Distressed Traveler*, a famous work engraved by John Landseer; the *Ratcatchers*, which is now at Lambton Castle; *Pointers to Be*; the *Larder Invaded*, and *Neptune*, the head and shoulders of a Newfoundland dog. The *Cat's Paw* was sent to the British Institution in 1824, and made an enormous sensation. In this year Landseer and C. R. Leslie made a journey to the Highlands—a momentous visit for the former, who thenceforward rarely failed annually to repeat it in search of studies and subjects.

In 1826 Landseer was elected an A.R.A. In 1827 appeared *The Monkey Who had Seen the World*, a picture which marked the growth of a taste for humorous subjects in the mind of the painter, and had been evoked by the success of the *Cat's Paw*. *Taking a Buck*, 1825, was the painter's first Scottish picture. Its execution marked a change in his style which, in increase of largeness, was a great improvement. In other respects there was a decrease of solid qualities; finish, searching modeling, and elaborate draughtsmanship rarely appeared in Landseer's work after 1823. After *High Life* and *Low Life*, pictures of 1831, now in the National Gallery, Landseer's dogs, and even his lions and birds, were more than half civilized. It was not that these later pictures were less true to nature than their forerunners, but the models were chosen from different grades of animal society. As Landseer prospered he kept finer company, and his new patrons did not care about rat-catching and dog-fighting, however vigorously and learnedly those subjects might be depicted. It cannot be said that the world lost much when, in exchange for the *Cat Disturbed* and *Fighting Dogs Getting Wind*, came *Jack in Office*, *The Highland Shepherd's Chief Mourner*, and *The Swannery Invaded by Sea Eagles*, three pictures which are types of as many diverse moods of Landseer's art, and each a noble one.

Four years after his election as A.R.A. Landseer was chosen an R.A. (1830.) *Chevy Chase* (1826), which is at Woburn, and the *Illicit Whiskey Still* (1829), appeared in the interval, and were followed by *High Life* and *Low Life* (1831), and *Spaniels of King Charles' Breed* (1832); the last is a wonder of brush handling. Landseer had by this time attained such amazing mastery that he painted *Spaniel and Rabbits* in two hours and a half, and *Rabbits*, which was at the British Institution, in three-quarters of an hour; and the fine dog-picture *Odin* (1836) was the work of one sitting, *i.e.*, painted within twelve hours. He began and finished a whole-length, life-size study of a fallow deer while Mr. Wells of Redleaf was at church. A more remarkable feat consisted in drawing, simultaneously, a stag's head with one hand and a head of a horse with the other. *Harvest in the Highlands*, and that masterpiece of humor, *Jack in Office*, were exhibited in 1833. In 1834 a noble work of sentiment was given to the world in *Suspense*, which is now at South Kensington, and shows a dog watching at the closed door of his wounded master. Many think this to be Landseer's finest work, others prefer the *Highland Shepherd's Chief Mourner* (1837). The over-praised and unfortunate *Bolton Abbey*, a group of portraits in character, was shown in the same year, and was the first picture for which the painter received £400. A few years later he sold *Peace* and *War* for £1,500, and for the copyrights alone obtained £6,000. *Man Proposes* (1864) was resold in 1881 for 6,300 guineas, and a cartoon for 5,000 guineas. *A Distinguished Member of the Humane Society*, a dog reclining on a quay wall (1838), was succeeded by *Dignity and Impudence* (1839). *The Lion Dog of Malta* and *Laying Down the Law* appeared in 1840. *The Defeat of Comus* was painted in the summer-house of Buckingham Palace garden in 1842. In this year was finished the capital *Highland Shepherd's Home* (Sheepshanks' Gift), together with the beautiful *Eos*, a portrait of Prince Albert's most graceful of grayhounds, to which Thomas Landseer added an ineffable charm and solidity not in the painting. *The Challenge* and *Coming Events Cast their Shadows Before* were accompanied (1844) by *Shoeing* (Bell Gift), and followed by *Peace*, and *War*, and the *Stag at Bay* (1846). *Alexander and Diogenes*, and a *Random Shot*, a kid dead on snow, came forth in 1848. This year Landseer received a national commission to paint in the Houses of Parliament three subjects connected with the chase. Although they would have been worth three times as much money, the House of Commons refused to grant £1,500 for these pictures, and the matter fell through, more to the artist's profit than the nation's gain. *The Sanctuary*, and *Night and Morning*, romantic and pathetic deer subjects, came in due order. For the latter a French jury of experts awarded to the artist the great gold medal of the Exposition Universelle, Paris, 1855.

The *Dialogue at Waterloo* (1850) commemorated Landseer's first visit to the continent, and showed how he, like nearly all English artists of original power and considerable fertility, owed nothing to French or Italian training. In the same year he received the honor of knighthood. The *Monarch of the Glen* (1851) was succeeded by *Geneva*, a group of asses, a mule, and a bull; *Titania and Bottom*, which comprises a charming queen of the fairies; and the dramatic design of the *Combat, or Night and Morning*, as above. Then came the *Children of the Mist* (1853), *Deer in Repose*, *Saved* (1856), *Braemar*, a noble stag, *Rough and Ready*, *Uncle Tom and his Wife for Sale* (1857). *The Maid and the Magpie*, the extraordinarily large cartoon called *Deer Browsing*, the *Twa Dogs*, and one or two minor paintings, were equal if not superior to any previously produced by the artist. Nevertheless, signs of breaking health were remarked in *Doubtful Crumbs*, and a *Kind Star* (1859). The immense and profoundly dramatic picture called a *Flood in the Highlands* (1860) more than reinstated the painter before the public, but friends still saw ground for uneasiness. Extreme nervous excitability manifested itself in many ways, and in the choice (1864) of the dreadful subject of *Man Proposes, God Disposes*, bears clumsily clambering among relics of Sir John Franklin's party, there was occult pathos, which some of the artist's intimates suspected, but did not avow. In 1862 and 1863 Landseer produced nothing; but with *Man Proposes* came *A Piper and a Pair of Nutcrackers*. The last triumph of Landseer's career was the *Swannery Invaded by Sea Eagles* (1869). After four years more, mainly of broken art and shattered mental powers, he died October 1, 1873. He was buried in St. Paul's.

LANDSHUT, chief town of a government district in Lower Bavaria, is situated on the right bank of the Isar, about forty miles northeast of Munich. The population is 17,873.

LANDSKRONA, one of the principal seaport and garrison towns in Sweden, is situated in the district of Malmö (in Skania) on the Sound (Öresund), about fifty-five miles west of Christianstad and fifteen miles by water from Copenhagen. Population (1900), 14,399.

LANE, Edward William, one of the greatest of European Arabists, was the son of Dr. Theophilus Lane, a prebendary of Hereford, and was born in 1801. He died at Worthing, August 10, 1876.

LANFRANC, thirty-fourth archbishop of Canterbury, and first after the Conquest, one of the ablest churchmen and scholars of his time, was the son of Hambald or Hanbald, one of the principal citizens of Pavia, and was born there about the year 1005. As regards his administration of his diocese Lanfranc's principal achievements were the rapid rebuilding of the metropolitan church (1072–79), the reforms he introduced among the monks of Christ Church, and his successful recovery of the estates of the see, which had been encroached on by the king's brother Bishop Odo, earl of Kent. Lanfranc died at Canterbury in May, 1089.

LANFREY, Pierre, the historian who has done the most to destroy the Napoleonic legend of M. Thiers, was born at Chambéry, the capital of Savoy, on October 26, 1828. After completing his studies at Paris he went to Grenoble in 1847 to study law, and while there took the keenest interest in the Revolution of 1848 at Paris. His law studies finished at Grenoble, he went to Turin, and qualified himself to act as *avocat* in his native country; but, on the news of the *coup d'état*, his passion to go to Paris and take his part in the inevitable struggle which he saw must arise between the second empire and the spirit of liberty was not to be restrained, and in 1853 he once more took up his abode in Paris. He at first tried in vain to get work on various newspapers, and then to get his first book, which had been sketched out for some years, published. No publisher was to be found, and *L'Église et les Philosophes au XVIIIième Siècle* was printed eventually at his own expense. It appeared in 1855, and at once achieved a great success, and introduced its author to some of the best literary society in Paris. It was followed in 1857 by an *Essai sur la Révolution Française*, and in 1860 by the *Histoire politique des Papes*, and the *Lettres d'Éverard*. The latter are a revelation of what Lanfrey thought and felt at this time, of his despair that France would ever get free from the enervating rule of the second empire, of his disgust at the literary sterility of the time in confining itself to vague philosophy and vaguer criticism; and through them he first became known outside the literary world. He had hitherto been intimate with such choice spirits as Ary Scheffer, Gleyre, and the Comtesse d'Agoult, better known as Daniel Stern, but the *Lettres d'Éverard* introduced him to the most fashionable Parisian society of the time, and the position he held in it is best to be found in the description of him contained in the souvenirs of his friend, Madame Clara Jaubert. In 1860 also he was appointed by M. Charpentier editor of the new *Revue Nationale*, in which he wrote the fortnightly chronicle of affairs for four years, besides various articles and reviews, collected in 1864, under the Title of *Études et Portraits politiques*. After resigning his editorship in 1864 he set to work on his great *Histoire de Napoléon I.*, in which he intended to overthrow the monument M. Thiers had erected to Napoleon in his *Histoire du Consulat et de l'Empire*, and to show the demigod uncle of Napoleon III. to have been but an immoral man and bad politician. The fourth volume of his history had not been published three months when the war of 1870 broke out. At first Lanfrey knew not what view to take, but on the defeats of the French, and the declaration of the republic, he enlisted as a simple volunteer, and marched to Lyons with his battalion. While there he heard first that his vigorous opposition in the press to the powerful influence of M. Gambetta had lost him his election to the Constituent Assembly in his native province, and next that he had been elected by the department of the Bouches du Rhône, in which he had never set foot. In the Assembly he warmly supported the Government of M. Thiers, and opposed the radical party as vehemently as he had opposed the empire, saying that both savored of tyranny. In 1871 M. Thiers appointed him French minister in Switzerland, where he remained till 1874, when he insisted on his resignation being accepted by the Duc de Broglie, and once more took his seat as a moderate republican. In 1875 he published the fifth volume of his *Histoire de Napoléon*, and in 1876 was elected a life senator; but his strength was fast failing, and, before he could give his sixth volume the careful revision he considered indispensable, he died at Pau on November 16, 1877.

LANGENSALZA, chief town of a circle in the government district of Erfurt, in the province of Saxony, Prussia, is situated on the Salza, about twenty miles northeast of Erfurt. Population (1900), about 14,000.

LANGLAND, or Langley, William, the author of a remarkable poem belonging to the close of the fourteenth century, of which the full title is—*The Vision of William concerning Piers the Plowman, together with Vita de Do-wel, Do-bet, et Do-best, secundum Wit et Resoun*, was born about 1332 perhaps at Cleobury Mortimer in Shropshire. In 1362, at the age of about thirty, he found himself wandering upon the Malvern hills, and fell asleep beside a stream, and saw in a vision a field full of folk, *i.e.*, this present world, and many other remarkable sights which he duly records. From this supposed circumstance he named his poem *The Vision of William*, though it is really a succession of visions, since he mentions several occasions on which he awoke, and afterward again fell asleep; and he even tells us of some adventures which befell him in his waking moments. In some of these visions there is no mention of Piers the Plowman, but in others he describes him as being the coming reformer who was to remedy all abuses, and restore the world to a right condition. It is remarkable that his conception of this reformer changes from time to time, and becomes more exalted as the poem advances. At first he was no more than a plowman, one of the true and honest laborers who are the salt of the earth; but at last he is identified with the great reformer who has come already, the regenerator of the world in the person of Jesus Christ. We may, in fact, consider Piers the Plowman as representing Christ himself, or, in the author's own phrase—"Petrus est Christus." If this be borne in mind, it will not be possible to make the mistake into which so many have fallen, of speaking of Piers the Plowman as being the author, not the subject, of the poem. The author may best be called William, or we may even give him the nickname of Long Will, which, as he himself tells us, was bestowed upon him from his tallness of stature—just as the poet Gascoigne was familiarly called Long George. Though there is mention of the Malvern hills more than once near the beginning of the poem, it is abundantly clear that the poet lived for "many years in Cornhill (London), with his wife Kitte and his daughter Calote." He seems to have come to London not long after the date of the first commencement of his work, and to have long continued there. He was very poor, wore long robes, and had a shaven crown, having received the clerical tonsure. But he seems only to have taken minor orders, and earned a precarious living by singing the *placebo dirige*, and seven psalms for the good of men's souls. The fact that he was married may explain why he never rose in the church. But he had another source of livelihood in his ability to write out legal documents, and he was extremely familiar with the law courts at Westminister. His leisure time must have been entirely occupied with his devotion to his poem, which was essentially the work of his lifetime. He was not satisfied with rewriting it once, but he actually rewrote it twice; and from the abundance of the MSS. which still exist we can see its development from the earliest draft, written about 1362, to its latest form, written after 1390. It is remarkable that the intermediate form, written later than 1370, is perhaps, taken upon the whole, the best of the three.

In 1399, just before the deposition of Richard II., appeared a poem addressed to the king, who is designated as "Richard the Redeles," *i.e.*, devoid of counsel. This poem, occurring in only one MS., in which it is incomplete, breaking off abruptly in the middle of a page, may safely be attributed to the same author, who was, at the time, passing through Bristol. As he was then about sixty-seven years of age, we may be sure that he did not long survive the accession of Henry IV. It may here be observed that the well-known poem entitled *Pierce Ploughman's Crede*, though excellently written, is certainly an imitation by another hand, viz., by the anonymous author of *The Plowman's Tale*, which is inserted in the black-letter editions of Chaucer, though it is none of his. The Pierce Ploughman of the *Crede* is very different in conception from the subject of William's vision.

LANGRES, a town in the department of Haute-Marne, France, 186 miles southeast from Paris, stands at a height of some 1,550 feet, upon a jutting promontory of the table-land to which it gives its name (Plateau de Langres), and overlooks, eastward and westward respectively, the valleys of the Marne and its tributary the Bonnelle. Its situation involves a rigorous climate, but also gives it strategic importance. Population (1901), 7,000.

LANGTON, Stephen, cardinal, forty-fourth archbishop of Canterbury, was born about the middle of the twelfth century; the place of his birth is unknown, but his family almost certainly belonged to Yorkshire. He died at Slindon on July 9, 1228.

LANGUAGE. See Philology.

LANGUEDOC, a province of France, which lay between the Garonne on the west and Rhone on the east, with the Pyrenees and the Mediterranean on the south. It was divided into the three sénéchaussées of Toulouse, Carcassonne, and Beaucaire; and it comprised, besides the province proper, the districts of Gevaudan, Vellai, Vivarez, Cevennes, and Foix. It contained the important cities of Toulouse, Carcassonne, Narbonne, Montpellier, Nismes, Cette, Viviers, Alby, and Foix.

Languedoc had, for two centuries, no other history apart from that of France. The long wars with the English affected the country little. The province, comparatively safe from war, continued to increase and prosper in wealth. When it begins again to have a history of its own, it appears to be the home of the most bigoted orthodoxy. The university of Toulouse burns a professor, Caturce, for supposed heresy, and exiles a scholar, Dolet, for daring to sympathize with him. At the east of the province, however, Rabelais, who carries with him an atmosphere of free thought, is lecturing and dissecting; and in the west of the province Gerard Roussel is already preaching the doctrines of a purer faith. In the wars of religion, the great recruiting ground of Coligny was in those southern provinces against which Simon de Montfort had led his crusade. The insurrection of the Camisards belongs to the history of Languedoc, but the struggle was confined to the north part of the province. The pacification by Villars and the duke of Berwick, the horrible cruelties practiced upon the people, and the singular story of Cavalier are noticed elsewhere.

A special interest attaches to the history of two towns, at least, of Languedoc. Both Montpellier and Toulouse present very remarkable features of interest to the student of municipal histories. The literature of the country is the literature called after its neighbor Provence, (*q.v.*) Probably no great future remains for the literature of a dialect slowly dying out, yet examples have not been wanting of late to prove that there is still vitality in the language of the people.

LANGUET, Hubert (1518–1581), diplomatist, and one of the boldest political writers of the sixteenth century, was born in 1518 at Viteaux, near Autun in Burgundy, and died in 1581.

LANNES, Jean, marshal of France, was born at Lectoure, April 11, 1769. He was the son of a livery-stable keeper, and was himself in early life apprenticed to a dyer. He had had but little education, but notwithstanding this his great strength and proficiency in all manly sports caused him, in 1792, to be elected sergeant-major of the battalion of volunteers of Gers, which he had joined on the breaking out of the war between Spain and the French republic. He served through the campaigns in the Pyrenees in 1793 and 1794, and in the latter year was elected *chef de brigade* However, in 1795, on the reform of the army introduced by the Thermidorians, he was dismissed from his rank. Not discouraged by this check, he reënlisted as a simple volunteer in the army of Italy. In the famous campaign of 1796 he again fought his way up to high rank, being eventually made, once more, *chef de brigade* by Bonaparte. He was distinguished in every battle, and was wounded at Arcola. He was chosen by Bonaparte to accompany him to Egypt as general of one of Kléber's brigades, in which capacity he greatly distinguished himself, especially on the retreat from Syria. He went with Bonaparte to France, assisted at the eighteenth Brumaire, and was appointed general of division, and commandant of the consular guard. He commanded the advanced guard in the crossing of the Alps in 1800, was instrumental in winning the battle of Montebello, from which he afterward took his title, and bore the brunt of the battle of Marengo. In 1801 Napoleon tried his favorite general as a diplomatist, and sent him as ambassador to Portugal. Opinions differ as to his merits in this capacity, but it may be presumed that Napoleon did not believe in them, as he never made such use of him again. On the establishment of the empire he was created a marshal of France, and commanded once more the advanced guard of a great French army in the campaign of Austerlitz. At Austerlitz he commanded the left, at Jena the center, and at Friedland the center of the French army, showing himself a general of division of the greatest merit, carrying out the orders given him to the letter, and never thinking them impossible. He was now to be tried as a commander-in-chief, for Napoleon took him to Spain in 1808, and gave him a *corps d'armée*, with which he won a victory over Castaños on November 22d. In January, 1809, he was sent to attempt the capture of Saragossa, and by February 21st was in possession of the place. Napoleon then created him Duc de Montebello, and once more, for the last time, gave him the command of the advanced guard of an army of invasion. At Aspern he was ordered with two divisions to cut the Austrian army under the archduke Charles in half; he succeeded entirely, though under a heavy fire, but finding himself unsupported by Napoleon, who had been thrown into confusion by the news that his bridges over the Danube had been broken, he had to retreat. During the retreat he exposed himself as usual to the hottest fire, and received a mortal wound. As he was being carried from the field to die at Vienna, he is said to have met and reproached his old general for his ambition; but this, to say the least, is a contested statement. Napoleon said of him that "he had found him a pigmy, and made him a giant;" and there can be no doubt of his marvelous ability on the field, and his extraordinary courage. His eldest son was made a peer of France by Louis XVIII.

LA NOUE, FRANÇOIS DE, surnamed Bras-de-Fer, one of the gallant Huguenot captains of the sixteenth century, was born near Nantes, in 1531, of an honorable and ancient Breton family. At the siege of Lamballe, in Brittany, he received the wound of which he died some days later at Moncontour, August 4, 1591.

LANSDOWNE, WILLIAM PETTY FITZMAURICE, FIRST MARQUIS OF, better known as a statesman while earl of Shelburne, was born at Dublin, May 20, 1737. Shortly after leaving the university he served as an officer in Wolfe's regiment during the Seven Years' War, and so distinguished himself at Minden and Kloster-Kampen that he was raised to the rank of colonel and appointed aide-de-camp to the king. Being thus brought into near communication with Lord Bute, he was in 1761 employed by that nobleman to negotiate for the support of Charles Fox. For a few months of the same year he sat in the House of Commons as member for Wycombe, until he succeeded his father as earl of Shelburne, in the Irish peerage, and Baron Wycombe in the peerage of Great Britain. Though he declined to take office under Bute, he undertook negotations to induce Fox to gain the consent of the Commons to the peace of 1763. After Pitt's return to power, in 1766, he became secretary of state, but during Pitt's illness his conciliatory policy toward America was completely thwarted by his colleagues and the king, and in 1768 he was dismissed from office. In 1782 he consented to take office under the marquis of Rockingham on condition that the king would agree to recognize the United States, and on the death of Lord Rockingham in the same year, he became premier; but the succession of Fox and his supporters led to the famous coalition of Fox with North, which caused his resignation in the following February, his fall being perhaps hastened by his proposed plans for the reform of the public service. He had also in contemplation a bill to promote free commercial intercourse between England and the United States. When Pitt acceded to office in 1784, Shelburne, instead of receiving a place in the cabinet. was created marquis of Lansdowne. Though giving a general support to the policy of Pitt he from this time ceased to take an active part in public affairs. He died May 7, 1805.

LANSING, a city in Ingham county, Mich., and capital of the State, is situated at the confluence of the Grand and Cedar rivers, eighty-five miles west-northwest of Detroit. In 1847, when it was made the seat of government, forests covered the site. The city has broad streets, arranged in the regular rectangular system; and seven iron and three wooden bridges connect the parts of the city, which lies on both sides of the rivers above mentioned. Lansing is the seat of the State reform school, the school for the blind, and the State agricultural college. The last named, opened in 1857, received 240,000 acres, granted by congress for the endowment of a college of agriculture and the mechanical arts; and its income is derived from the interest of the price of part of the land, and from an annual grant from the State legislature. A graded system of public schools and a State library of 40,000 volumes are among the other educational resources of the city. Its most conspicuous building is the new State capitol, erected at a cost of $1,500,000. The leading manufacture is of agricultural implements; but there are extensive manufactories of carriages, wagons, wheelbarrows, and steam engines, and four large flouring mills. Good water-power is afforded by the Grand river, and four lines of railway offer ample shipping facilities. The city was incorporated in 1859, and had a population (1900) of 16,485.

LANSINGBURG, a village in Rensselaer county, N. Y., is situated on the east bank of the Hudson, close to Troy, and nearly opposite Waterford, to which a bridge extends. Population (1900), 12,595.

LANTARA, SIMON MATHURIN, French landscape painter, was born at Oncy March 24, 1729, and died in 1778.

LANTERN-FLY, a name applied to certain insects belonging to the Homopterous division of the order *Hemiptera*, which may be broadly placed in the genus *Fulgora*, although this is now subdivided into many genera. They are mostly large insects, and gayly colored, remarkable for the forehead being produced into the semblance of a snout or muzzle (often upturned at the tip), the so-called "lantern." This snout is hollow, and is merely an inflated production of the head. Madame Merian stated that the common South American species, now known as *Fulgora laternaria*, L., was highly luminous at night, so much so that she was enabled to read by the light of one only, and that when several were confined together the interior of the box appeared all ablaze. No one doubted these statements, and the illustrious Linnæus used the words, "It emits a very strong light from the forehead," in diagnosing the insect in his *Systema Naturæ.* Moreover, it was believed that, because one species had been asserted to be luminous, others allied thereto must possess the same power; the specific names used by Linnæus, such as *candelaria*, *phosphorea*, *noctivida*, *lucernaria*, and *flammea*, may be adduced as instances. Of these one only, the *F. candelaria* of China, has become (with the original *laternaria*) a subject of controversy, for it also was asserted to be luminous. As time wore on many intelligent naturalists and other travelers visited both South America and China, and they concluded that the light must be produced only under very exceptional conditions, or that the original statement was an error, for they could not detect any luminosity, nor, as a rule, was such a property believed in by the natives of the regions. Quite recently many naturalists of undoubted authority have resided for years in the districts where these insects occur without having personally detected luminosity (though directly in search of it), and without obtaining any indications of the existence of such a belief in the minds of the natives.

LANTHANUM. It will be convenient to notice under this heading the group of closely allied metals—LANTHANUM, CERIUM, and DIDYMIUM.

In an abandoned copper mine at Riddarhyttan, Westmanland, in Sweden, there occurs a heavy, compact mineral, which, though pretty abundant there, is hardly met with anywhere else. This mineral was long mistaken for tungsten (syn. scheelite), until Klaproth of Berlin in 1803 found in it a peculiar earth, which he called *ochroite earth*, as it becomes yellow when heated in air. About the same time Berzelius and Hisinger made the same discovery; and (rightly) presuming the new earth to be an oxide of a new metal, they called the latter *cerium* (after the planet Ceres, the then latest discovery in astronomy) and the mineral *cerite*, which names have been retained to this day. Only the name "cerium" now has a more specific meaning, it having been shown by Mosander (in 1839–41) that Berzelius' cerium is a mixture of three metallic radicles, namely, cerium proper, lanthanum, and didymium. These metals are very closely related to one another in their chemical character, and may be conveniently treated together. The extraction from cerite, of the oxide group, offers no difficulty. According to Marignac the powdered mineral is made into a thick paste with oil of vitriol, and the reaction which sets in allowed to accomplish itself. The remaining dry white powder is placed in a crucible, and kept there for a long time at a temperature below redness, but sufficient to chase away the bulk of the free sulphuric acid. The residue is added in small installments to a quantity of cold water, and the gangue (ferruginous silica) filtered off. The solution is boiled, when the greater part of the *cerite-oxides* comes down in the form of sulphate almost free from foreign oxides. The sulphates can be purified by redissolving them in the least quantity of water at 5° to 6° C., filtering, and reprecipitating by boiling. What remains in the mother-liquors is recovered by precipitation with sulphate of potash (which must be added as a solid and in sufficient quantity to saturate the solution) as an alum-like double sulphate. The purified sulphates are dissolved in cold water, precipitated as oxalates by means of oxalate of ammonia, and the washed oxalates ignited, when the pure cerite-oxide mixture remains. The separation of the three oxides from one another offers very great difficulties. Comparatively easy is the extraction of approximately pure oxide of cerium, by Berzelius' method. Dissolve the mixed oxide (which must be free of sulphate if the method is to succeed) in nitric acid, evaporate to dryness, ignite the residue, and treat it with nitric acid diluted with one hundred times its weight of water. Only lanthanum and didymium dissolve, impure binoxide of cerium remaining, which can be further purified by treatment with more concentrated nitric acid, which, however, besides the lanthanum and didymium, dissolves a good deal of the cerium itself.

The metals were known only in a powdery form up to 1876, when Hillebrand and Norton succeeded in preparing them in a compact form by the electrolysis of the fused chlorides. The three metals are very similar to one another; they are steel-gray ductile true metals, melting at a somewhat lower temperature than silver. Specific gravities range from 6.1 to 6.6. They are more readily inflammable than magnesium.

The atomic weights of the three elements are now (1890) quoted as Ce = 141, La = 139, Di = 147.

LANZI, LUIGI, a writer on Etruscan antiquities and on the history of Italian painting, was born in 1732. Lanzi died of apoplexy, March 30, 1810, in the seventy-eighth year of his age.

LAOCOON, in Greek legend, was a brother of Anchises, and had been a priest of Apollo, but having married against the will of the god he and the two sons of this marriage were attacked by serpents while preparing to sacrifice a bull at the altar of Poseidon, in whose service Laocoon was then acting as priest. An additional motive for his punishment consisted in his having warned the Trojans against the wooden horse left by the Greeks. But, whatever his crime may have been, the punishment stands out even among the tragedies of Greek legend as marked by its horror—particularly so as it comes to us in *Virgil*, and as it is represented in the marble group in the Vatican. In the oldest existing version of the legend—that of Arctinus of Miletus, which has so far been preserved in the excerpts of Proclus—the calamity is lessened by the fact that only one of the two sons is killed; and this, as has been pointed out, agrees with the interpretation which Goethe in his *Propylæa* had put on the marble group without reference to the literary tradition. He says:—"The younger son struggles and is powerless, and is alarmed; the father struggles ineffectively, indeed his efforts only increase the opposition; the elder son is least of all injured, he feels neither anguish nor pain, but he is horrified at what he sees happening to his father, and he screams while he pushes the coils of the serpent off from his legs. He is thus an observer, witness, and participant in the incident, and the work is then complete." Again, "the gradation of the incident is this: the father has become powerless among the coils of the serpent; the younger son has still strength for resistance but is wounded; the elder has a prospect of escape." Lessing, on the other hand, maintained the view that the marble group illustrated the version of the legend given by Virgil, with such differences as were necessary from the different limits of representation imposed on the arts of sculpture and of poetry. These limits required a new definition, and this he undertook in his still famous work, *Laokoon.* The marble group in the Vatican was found in 1506 near the baths of Titus, and there is no question of its being the same which Pliny speaks of as in the palace of Titus, and as the work of three Rhodian sculptors, Agesander, Polydorus, and Athenodorus. They made it, he says, *de consilii sententia*, which, according to the highest Latin authorities, must refer not to a standing imperial council, but to a council selected *ad hoc*. This suits the theory of the sculpture being a work of the time of Titus—not an original conception of that time, but a variant of a conception more or less familiar to Greek art since the time of Alexander, such as may be seen in marble reliefs, on gems, in a painting found at Pompeii and on a terra-cotta Etruscan urn in the British Museum. The names of Agesander and Athenodorus have been found repeatedly on bases of sculptures in Italy, and the date of the writing is that of the time of Titus. Still the opinion is very generally held that the Vatican group is altogether a work of the Rhodian school during its supremacy after the death of Alexander, and that the artists named by Pliny had lived then, and were apparently a father and two sons, for which reason Pliny may have thought it necessary to add *de consilii sententia*, in the sense of "according to the decision of their combined thoughts," to prevent anyone supposing that the artists had each made one of the figures, selecting them possibly in accordance with their own relationship to each other, the father taking Laocoon, and the sons taking respectively the sons of Laocoon. As yet, however, the characteristics of the Rhodian school are not sufficiently known for a final settlement of this long standing question.

LAODICEA is the name of at least eight cities, founded or renovated in the later Hellenic period. Most of them were founded by the Seleucid kings of Syria. Seleucus, founder of the dynasty, is said by Appian to have named five cities after his mother Laodice. Many other women of the family bore the same name, which also passed by marriage into the family of the Pontic kings. The victories of Alexander introduced Greek civilization over Asia; the organizing and city-building energy of his successors established and consolidated it. They either founded new cities in favorable situations or reorganized native cities after the Greek model; thus over the immense realm of the Seleucidæ from the Ægean Sea to the borders of India we find numberless cities called Seleucia, Laodicea, etc. So long as Greek civilization held its ground, these were the great commercial and social centers of the country. We find a Laodicea *ad Lycum* in the Mæander valley, on the borders of Phrygia, Caria, and Lydia; another surnamed *Combusta* on the borders of Phrygia, Lycaonia, and Pisidia; a third in Pontus; a fourth *ad mare*, on the coast of Syria; a fifth, *ad Libanum*, beside the Lebanon mountains; and three others in the far east—Media, Persia, and the lower Tigris valley. In the latter countries Greek civilization was overwhelmed in Orientalism after a century or two, and the last three cities disappeared; the other five continued great throughout the Greek and Roman period, and the second, third, and fourth retain to the present day the ancient name under the pronunciation Ladik, Ladikiyeh, or Latakia. (See LATAKIA.)

Laodicea ad Lycum was founded probably by Antiochus II. Theos (261–46 B.C.), and named after his wife Laodice. Its site, called by the Turks *Eski Hissar*, "the old castle," is now solitary and deserted; but it retains an undying interest as one of the oldest homes of Christianity and the seat of one of the seven churches of the Apocalypse. Pliny tells us that the town was called in older times Diospolis and Rhoas; but it is certain that at an early period Colossæ, a few miles to the east, and Hierapolis, six miles to the north, were the great cities of the neighborhood, and that Laodicea was a place of no importance till the Seleucid foundation. A favorable site was found on some low hills of alluvial formation, about two miles south of the river Lycus (Churuk Su) and nine miles east of the confluence of the Lycus and Mæander. Smaller rivers of the neighborhood are the Asopus, Caprus, and Cadmus, the last named after the lofty range of Mount Cadmus (Baba Dagh), which overhangs the Mæander valley on the south. The great trade route from the Euphrates and the interior passed through Apamea to Laodicea. There it forked, one branch going straight down the Mæander valley to Magnesia and thence north to Ephesus, a distance of about ninety miles, and the other branch crossing the mountains by an easy pass to Philadelphia and the Hermus valley, Sardis, Thyatira and at last Pergamus. St. Paul alludes to the situation of Laodicea beside Colossæ and Hierapolis; and the order in which the last five churches of the Apocalypse are enumerated is explained by their position on the road just described. Placed in this important situation, in the center of a very fertile district, Laodicea became a rich city. It was famous for its money transactions, and for the beautiful soft wool grown by the sheep of the country. Both points are referred to in the message to the church.

LAON, capital of the department of Aisne, France, is situated eighty-seven miles northeast of Paris, on an isolated and singularly buttressed hill, which rises some 330 feet above the surrounding plain and the little river of Ardon, which flows into the Lette, a tributary of the Oise. From the railway station, which is situated in the plain to the north, a straight staircase of several hundred steps leads up to the gates of the town, but all the roads connecting Laon with the surrounding district are cut in zigzags on the steep slopes, which are crowned by the old and partly ruinous ramparts. Laon owes its rank as capital of the department to its central position and to its age; it numbers only 12,000 inhabitants, and has hardly any trade.

LAOS, or LAWA, a large Indo-Chinese nation, occupying the northern and eastern provinces of Siam known as the Laos states. There are two main divisions—the Lau-pang-kah, or "White Paunch" Laos, and the Lau-pang-dun, or "Black Paunch" Laos, the former between the Deng-Phya-Phai range and the river Mekong, the latter about the middle and upper course of the river Menan, and so called from the habit of tattooing a black pattern about the navel. The Laos are closely related in physique and speech to the Siamese proper, and are by some writers regarded as the primitive stock of that race. They are an historical people who were formerly constituted in an ancient and powerful kingdom, whose capital Vinh-khianh (Vien-shan) was taken and destroyed by the Siamese about the year 1828. Since then they have been entirely subject to Siam, and are governed partly by khiao, or native hereditary princes, partly by mandarins or governors directly nominated by the Bangkok authorities. The present khiao of the province of Bassak north of Camboja is the last surviving descendant of the ancient Lao dynasty. The khiao are invested by means of the gold dish, betel-box, spittoon, and teapot which are sent from Bangkok, and returned at their death or deposition. Of all the khiao the most powerful is the prince of Ubon, whose jurisdiction extends nearly from Bassak on the Mekong northward to the great southern bend of that river.

Apart from the passions associated with the infamous slave trade, encouraged by their rulers, the Laos are an inoffensive, unwarlike, and peace-loving race, fond of music, and living chiefly on a diet of rice, vegetables, fruits, fish, and poultry. Pure and mixed, they number altogether perhaps some 1,500,000.

LÂO-TSZE, or LAOU-TSZE, the designation of the author of the celebrated treatise called *Tâo Teh King*, and the reputed founder of the religion called *Tâoism.*

All that we know about Lâo-tsze goes into small compass. His surname was Li, and his name Urh. He was a native of the state of Ch'û, and was born in a hamlet, which we must place not far from the present prefectural city of Kwei-teh in Ho-nan province. What is of more importance, he was one of the recorders or historiographers at the court of Châu, his special department being the charge of the whole or a portion of the royal library. He must thus have been able to make himself acquainted with all the history of his country and of the men who had played the most distinguished part in its affairs. Ch'ien does not mention the year of his birth, which is often said, though on what Chinese authority does not appear, to have taken place in the third year of King Phing, corresponding to 604 B.C. That date cannot be far from the truth. That he was contemporary with Confucius is established by the concurrent testimony of the *Lî Kî* and the *Kiâ Yü* on the Confucian side, and of Chwang-tsze and Sze-ma Ch'ien on the Tâoist. The two men whose influence has been so great on all the subsequent generations of the Chinese people, and whose views are now more attentively studied by thinking men of other nations than ever they were before—Khung-tsze and Lâo-tsze—had at least one interview, in 517 B.C., when the former was in his thirty-fifth year

Leaving these scanty historical notes, and accepting the *Tâo Teh King* as the veritable work of Lâo-tsze, we must now try to give the reader some idea of its contents. Consisting, it has been seen, of not more than between five and six thousand characters, it is but a short treatise—not half the size of our Gospel of St. Mark. The nature of the subject, however, the want of any progress of thought or of logical connection between its different parts, and the condensed style, with the mystic tendencies and poetical temperament of the author, make its meaning extraordinarily obscure, as native scholars and Sinologists have found to their cost. Divided at first into two parts, it has subsequently and conveniently been subdivided into chapters. One of the oldest, and the most common, of these arrangements makes the chapters eighty-two.

Some Roman Catholic missionaries, nearly two centuries ago, fancied that they found a wonderful harmony between many passages and the teaching of our sacred Scriptures. Montucci of Berlin, who had adopted their views, ventured to say in 1808:—" Many things about a Triune God are so clearly expressed that no one who has read this book can doubt that the mystery of the Holy Trinity was revealed to the Chinese five centuries before the coming of Jesus Christ." Even Remusat, the first occupant of a Chinese chair in Europe, published at Paris in 1823 his *Mémoire sur la Vie et les Opinions de Lâo-tsze*, to vindicate the view that the Hebrew name Jehovah was phonetically represented in the fourteenth chapter by Chinese characters. These fancies were exploded by the late Stanislas Julien, when he issued in 1842 his translation of the whole treatise as *Le Livre de la Voie et de la Vertu.*

The most important thing is to determine what we are to understand by the *Tâo*, for *Teh* is merely its outcome, especially in man, and is rightly translated by our word "virtue." Julien, we have just seen, translated *Tâo* by "la voie." Chalmers leaves it untranslated. "No English word," he says, "is its exact equivalent. Three terms suggest themselves—the way, reason, and the word; but they are all liable to objection. Were we guided by etymology, 'the way' would come nearest the original, and in one or two passages the idea of a way seems to be in the term; but this is too materialistic to serve the purpose of a translation. 'Reason,' again, seems to be more like a quality or attribute of some conscious being than *Tâo* is. I would translate it by 'the Word,' in the sense of the Logos, but this would be like settling the question which I wish to leave open, viz., what resemblance there is between the Logos of the New Testament and this Chinese Tâo." Latterly some Sinologues in China have employed "nature" as our best analogue of the term. Thus Watters (*Lâo-tsze, A Study in Chinese Philosophy*, p. 45) says:—"In the *Tâo Teh King* the originator of the universe is referred to under the names Non-Existence, Existence, Nature (*Tâo*), and various designations—all which, however, represent one idea in various manifestations. It is in all cases Nature (*Tâo*) which is meant." This view has been skillfully worked out; but it only hides from us the scope of "the Venerable Philosopher." "Nature" cannot be accepted as a *translation* of *Tâo*. That character was, primarily, the symbol of a way, road, or path; and then, figuratively, it was used, as we also use *way*, in the senses of means and method—the *course* that we pursue in passing from one thing or concept to another as its end or result. It is the name of a quality. Professor Douglas has well said (*Confucianism and Tâoism*, p. 189):—"If we were compelled to adopt a single word to represent the *Tâo* of Lâo-tsze, we should prefer the sense in which it is used by Confucius, 'the way,' that is, *μέθοδος*."

What then was the quality which Lâo-tsze had in view, which he thought of as the *Tâo*—there in the library of Châu, at the pass of the valley of Han, and where he met the end of his life beyond the limits of the civilized state? It was the simplicity of spontaneity, action (which might be called non-action) without motive, free from all selfish purpose, resting in nothing but its own accomplishment. This is found in the phenomena of the material world. "All things spring up without a word spoken, and grow without a claim for their production. They go through their processes without any display of pride in them; and the results are realized without any assumption of ownership. It is owing to the absence of such assumption that the results and their processes do not disappear." It only needs the same quality in the arrangements and measures of government to make society beautiful and happy. "A government conducted by sages would free the hearts of the people from inordinate desires, fill their bellies, keep their ambitions feeble, and strengthen their bones. They would constantly keep the people without knowledge and free from desires; and, where there were those who had knowledge, they would have them so that they would not dare to put it in practice." A corresponding course observed by individual man in his government of himself becoming again "as a little child" will have corresponding results. "His constant virtue will be complete, and he will return to the primitive simplicity."

Such is the subject-matter of the *Tâo Teh King*—the operation of this method, or *Tâo*, "without striving or crying," in nature, in society, and in the individual. Much that is very beautiful and practical is inculcated in connection with its working in the individual character. The writer seems to feel that he cannot say enough on the virtue of humility. There were three things which he prized and held fast—gentle compassion, economy, and the not presuming to take precedence in the world. His teaching rises to its highest point in chap. lxiii.:—"It is the way of *Tâo* not to act from any personal motive, to conduct affairs without feeling the trouble of them, to taste without being aware of the flavor, to account the great as small and the small as great, to recompense injury with kindness." This last and noblest characteristic of the *Tâo*, the requiting "good for evil," is not touched on again in the treatise; but we know that it excited general attention at the time, and was the subject of conversation between Confucius and his disciples.

What is said in the *Tâo* on government is not, all of it, so satisfactory. The writer shows, indeed, the benevolence of his heart. He seems to condemn the infliction of capital punishment, and he deplores the practice of war; but he had no sympathy with the progress of society or with the culture and arts of life. He says:—"Those who anciently were skilled in practicing the *Tâo* did not use it to enlighten the people; their object rather was to keep them simple. The difficulty in governing the people arises from their having too much knowledge, and, therefore, he who tries to govern a state by wisdom is a scourge to it, while he who does not try to govern thereby is a blessing." The last chapter but one is the following:—"In a small state, with few inhabitants, I would so order it that the people, though supplied with all kinds of implements, would not (care to) use them; I would give them cause to look on death as a most grievous thing, while yet they would not go away to a distance to escape from it. Though they had boats and carriages, they should have no occasion to ride in them. Though they had buff-coats and sharp weapons, they should not don or use them. I would make them return to the use of knotted cords (instead of written characters). They should think their coarse food sweet, their plain clothing beautiful, their poor houses places of rest, and their common, simple ways sources of enjoyment. There should be a neighboring state within sight, and the sound of the fowls and dogs should be heard from it to us without interruption; but I would make the people to old age, even to death, have no intercourse with it."

On reading these sentiments, we must judge of Lâo-tsze that, with all his power of thought, he was only a dreamer. But thus far there is no difficulty arising from his language in regard to the *Tâo*. It is simply a quality, descriptive of the style of character and action, which the individual should seek to attain in himself, and the ruler to impress on his administration. The language about the *Tâo* in nature is by no means so clear. While Professor Douglas says that "the way" would be the best translation of *Tâo*, he immediately adds: "But *Tâo* is more than the way. It is the way and the way-goer. It is an eternal road; along it all beings and things walk; but no being made it, for it is being itself; it is everything, and nothing, and the cause and effect of all. All things originate from *Tâo*, conform to *Tâo*, and to *Tâo* at last they return."

Some of these representations require modification; but no thoughtful reader of the treatise can fail to be often puzzled by what is said on the point in hand. Julien, indeed, says with truth (p. xiii.) that "it is impossible to take *Tâo* for the primordial Reason, for the sublime Intelligence, which has created and governs the world;" but the fact is that many of Lâo-tsze's statements are unthinkable if there be not behind the *Tâo* the unexpressed recognition of a personal creator and ruler. Granted that he does not affirm positively the existence of such a Being, yet certainly he does not deny it, and his language even implies it. It has been said, indeed, that he denies it, and we are referred in proof to the fourth chapter:—"*Tâo* is like the emptiness of a vessel; and the use of it, we may say, must be free from all self-sufficiency. How deep and mysterious it is, as if it were the author of all things! We should make our sharpness blunt, and unravel the complications of things; we should attemper our brightness, and assimilate ourselves to the obscurity caused by dust. How still and clear is *Tâo*, a phantasm with the semblance of permanence! I do not know whose son it is. It might appear to have been before God (*Ti*)."

The reader will not overlook the cautious and dubious manner in which the predicates of *Tâo* are stated in this remarkable passage. The author does not say that it was before God, but that "it might appear" to have been so. Nowhere else in his treatise does the nature of *Tâo* as a method or style of action come out more clearly. It has no positive existence of itself; it is but like the emptiness of a vessel, and the manifestation of it by men requires that they endeavor to free themselves from all self-sufficiency. Whence came it? It does not shock Lâo-tsze to suppose that it had a father, but he cannot tell whose son it is. And, as the feeling of its mysteriousness grows on him, he ventures to say that "it might appear to have been before God."

There is here no denial, but express recognition, of the existence of God, so far as it is implied in the name *Tî*, which is the personal name for the concept of heaven as the ruling power, by means of which the fathers of the Chinese people rose in prehistoric time to the idea of God. Again and again Lâo-tsze speaks of heaven just as "we do when we mean thereby the Deity who presides over heaven and earth." The last sentence of his treatise is:—"It is the *Tâo*—the way—of Heaven to benefit and not injure; it is the *Tâo*—the way—of the sage to do and not strive."

LA PAZ, officially since 1825 LA PAZ DE AYACUCHO, in memory of the battle of Bolivian independence, is the capital of Bolivia, at the head of a department of its own name. It lies at the height of 11,970 feet above the sea, in the valley of the Chuquiapo, or Rio de la Paz, at the base of the Cordillera Real, which rises with imposing cliffs another thousand feet above it, about forty miles to the east of Lake Titicaca. The population, which consists largely of Aymaras, is estimated at between 55,000 and 57,000. The city dates from 1548, and the name Pueblo Nuevo de N. Señora de la Paz was given by its founder, Alonzo de Mendozo, in honor of the reconciliation between Pizarro and Almagro. In 1605 it was made a bishopric.

LA PÉROUSE, JEAN-FRANÇOIS GALAUP DE, a French navigator, was born near Albi, August 22, 1741. His family name was Galaup, and La Pérouse or La Peyrouse was an addition adopted by himself from a small family estate. As a lad of eighteen he was wounded and made prisoner on board the *Formidable* when it was captured by Admiral Hawke in 1759; and during the war with England between 1778 and 1783 he served with distinction in various parts of the world, more particularly on the eastern coasts of Canada. His celebrity, however, is rather due to the expedition fitted out by the French Government in 1785 for the discovery of the Northwest Passage, and the verification of various matters left doubtful by previous circumnavigators. La Pérouse was placed in command of the *Boussole*, and his chief assistant De Langle in command of the *Astrolabe*. They sailed from Brest, August 1, 1785, and reached Mount St. Elias, on the coast of Alaska, June 23, 1786. From the search for the Northwest Passage they were deterred by the same storms which had proved too much for earlier adventurers; and, though they visited the Sandwich Islands, Macao, and the Philippines, it was not till they reached the coasts of northwestern Asia that they really broke new ground. There the discovery of Sanger Strait and La Pérouse Strait showed that Saghalien and Yezo were each an independent island. The explorers were well received by the Russian authorities in Kamchatka, and M. Lesseps was sent home overland with the records of the expedition. In December, 1787, De Langle, Lamonon, the naturalist, and ten of the crew of the *As-*

trolabe were massacred on one of the Navigator Islands; and, after reaching Botany Bay in safety, the rest of the expedition was not again heard of. It was not till 1825 that Captain Dillon found the wreckage of what must have been the *Boussole* and the *Astrolabe* on the reefs of Vanikoro, an island to the north of the New Hebrides.

LAPIDARY (*lapidarius*, from *lapis*, a stone), one who cuts, grinds, polishes, and engraves small pieces of stone, especially gems. The prehistoric stone implements found in cave deposits, peat-mosses, river-gravels, etc., may be regarded as the earliest examples of the chipping and grinding of stone.

The small tools used for engraving stones are set in a horizontal position, and are worked by vertical driving gear. They are of various forms, and are made of soft iron and charged with diamond dust and oil. Any substance finely pulverized, and of greater hardness than the material operated upon, may be used for cutting and grinding stone, but diamond dust is preferred as it can be used sparingly by the employment of very thin slitting disks, into the edges of which it is imbedded by the application of an agate or glass roller, the dust being previously worked into a paste with oil. Oil of brick or soft soap is used freely as a lubricant during the process of cutting. The diamond powder is procured by finely pulverizing imperfect stones, usually the coarse variety termed *bort* or carbonado, in a steel mortar; or it is ground between flat iron slabs with oil of brick.

The iron slicing disk in common use is eight or nine inches in diameter and about $\frac{1}{200}$ inch in thickness. Such disks with their driving gear are termed *slitting-mills*. When leaden laps charged with emery mud are substituted the arrangement is called a *roughing-mill*, and when leaden or pewter laps charged with rottenstone are used it is known as a *polishing-mill*. The mills are sometimes worked by steam power, sometimes by hand. In slicing stones it is necessary not to bring any sharp edge of the stone against the disk, but to commence upon a moderately flat or smooth surface, otherwise the charge of diamond dust or *seasoning*, which should last for several hours, will be stripped off during the first revolution.

Where practicable, the lapidary avails himself of the natural cleavages in the mineral upon which he is going to operate, and these are constant in direction in any one species, but are more easily available in certain minerals than they are in others. When no satisfactory cleavage planes exist, the mineral may be sawn into slices by a thin wire charged with diamond dust. The diamond is cut and polished upon a lap of cast-iron fed with diamond dust and olive oil. Gems having a hardness of eight and nine (Mohs' scale) are cut on copper disks, similarly primed, and are afterward polished with tripoli and water. Stones of inferior hardness are ground upon a leaden lap with emery and water, and are polished on tin disks with tripoli, or on zinc disks with putty-powder and water. In grinding very fragile or soft stones disks of hardwood are employed. Precious stones are cut in forms known as *brilliants* and *roses*. Turquoise, opal, catseye, carbuncle, asteria, and a few other stones are cut en cabochon.

Prior to engraving on a stone, the polish is removed with emery from the surface to be engraved, and the device marked on it with a brass point; the outline is then sharply incised, and the work continued by means of small drills, the diamond point, etc.

Within the last few years a great advance has been made in our knowledge of the minute structure and mineral constitution of rocks by cutting and grinding small slices of them so thin that they readily transmit light, and can then be examined under the miscroscope, and the optical properties of their constituent minerals conveniently studied. Sections suitable for this purpose may be prepared by grinding thin flakes or splinters of a rock or mineral upon a cast-iron plate smeared with emery powder and water. The emery employed for the first grinding should not be very fine, that of medium grain being best suited for the purpose. The fragment is pressed by the fingers against the slab, and ground uniformly over all parts of the plate with a circular motion. When a flat surface is obtained, the fragment should be carefully washed from all traces of the emery mud, and a finer face should be imparted to it by a second grinding with the finest flour-emery and water, smeared upon a slab of plate-glass or a smoothly-planed brass slab. When thoroughly cleaned, the smooth face of the chip is warmed and cemented to a small piece of plate-glass with Canada balsam. The older and drier the balsam the better it answers this purpose. A little should be placed on the piece of glass and warmed until it liquefies (it must not boil). The smooth surface of the stone is then laid upon the balsam and pressed tightly against the glass; when the balsam has hardened, the grinding process is renewed, the piece of glass serving as a handle, and the flour-emery should be employed as soon as the fragment is thin enough to transmit light. When finished, the glass and section are cleaned, the glass is warmed, and the section is pushed off with a blunt needle or wire into a saucer of turpentine, which should be gently warmed, and all traces of dirt should be removed with a camel's hair brush. The section is then lifted from its bath by means of a needle and allowed to subside gently upon a drop of fluid Canada balsam placed on a clean glass slip which has been previously warmed. A thin covering-glass is then slightly warmed and placed over the preparation, care being taken not to include any air-bubbles. The process of grinding sections by hand is necessarily a rather slow one, and, although in the finishing it cannot well be superseded by other methods, still the rough grinding may be much more expeditiously done by means of various machines which have been devised for this purpose. Some of these are worked by hand, others by a treadle.

LAPIS LAZULI, a mineral possessing usually a fine blue color, whence it is much prized for decorative purposes. From the large number of Egyptian ornaments in this material, which have been preserved from the time of the Pharaohs, it is evident that it was a favorite stone with the ancient Egyptians. A few Assyrian seal-cylinders in lapis lazuli are also known. It appears to have been the Greek sapphire; thus, Theophrastus describes the *sappheiros* as sprinkled with gold-dust, a description which is utterly inappropriate to any variety of our modern sapphire, but which applies with much force to the lapis lazuli, inasmuch as this stone frequently contains disseminated particles of iron pyrites, which by their color and luster may readily be mistaken for such a metal. In like manner, Pliny refers to one variety of the *sapphirus* as being spotted with gold.

The lapis lazuli is usually found in crystalline limestone or in gneissose rocks, but its occurrence is confined to very limited localities. It is found in Persia, Tartary, Tibet, and China, and in the neighborhood of Lake Baikal in Siberia. Fine masses occur in the Andes of Chili and Peru. In Europe it has been found at Ditro in Transylvania, and in the ejected blocks of Monte Somma.

In addition to its use as an ornamental stone, the lapis lazuli was formerly employed, to a large extent, in the preparation of the beautiful blue pigment called *ultramarine*.

LAPITHÆ, a mythic race whose contest with the

Centaurs is one of the most famous events in Greek mythology and one of the most favorite subjects of Greek art. The home of the legend is the district around Mount Pelion in Thessaly; it is not found in the other places where the Centaur legend has its home—Pholoe in Arcadia, and the river Evenus in Ætolia. It is impossible to write of the Lapithæ without including also their adversaries the Centaurs and the great battle at the marriage of Pirithous and Deidamia. The outlines of the legend have already been given under CENTAUR.

LAPLACE, PIERRE SIMON, MARQUIS DE, one of the greatest mathematicians and physical astronomers who ever lived, was born at Beaumont-en-Auge in Normandy, March 28, 1749. His early years have remained in the obscurity with which poverty and some ignoble shame of poverty combined to cover them. It is known, however, that his father was a small farmer, and that he owed his education to the interest excited by his lively parts in some persons of position. His first distinctions are said, singularly enough, to have been gained in theological controversy, but at an early age he became mathematical teacher in the military school of Beaumont, the classes of which he had attended as an extern. He was not more than eighteen when, armed with letters of recommendation, he approached D'Alembert, then at the height of his fame and influence, in the hope of finding a career in Paris. The letters remained unnoticed, but Laplace was not a man to be crushed by the first rebuff of fortune. He wrote to the great geometer a letter on the principles of mechanics, which evoked an immediate and enthusiastic response. ' You," said D'Alembert to him, " needed no introduction; you have recommended yourself; my support is your due." He accordingly obtained for him an appointment as professor of mathematics in the École Militaire of Paris, and continued to forward his interests with zeal and constancy.

The future of the young mathematician was now assured, and his scientific vocation finally determined. He had not yet completed his twenty-fourth year when he entered upon the course of discovery which has earned him the title of " the Newton of France." Having in his first published paper shown his mastery of analysis, he immediately proceeded to apply the powerful instrument at his command to the great outstanding problems in the application of the law of gravitation to the celestial motions. Of these the most conspicuous was offered by the opposite inequalities of Jupiter and Saturn, which the emulous efforts of Euler and Lagrange had failed to bring within the bounds of theory. The discordance of their results incited Laplace to a searching examination of the whole subject of planetary perturbations, and his maiden effort was rewarded with a discovery which constituted, when developed and completely demonstrated by his own further labors and those of his illustrious rival, Lagrange, the most important advance made in physical astronomy since the time of Newton. In a paper read before the Academy of Sciences, February 10, 1773, Laplace announced his celebrated conclusion of the invariability of planetary mean motions, carrying the proof as far as the cubes of the eccentricities and inclinations. This was the first and most important step in the establishment of the stability of the solar system. It was followed up by a series of profound investigations, in which Lagrange and Laplace alternately surpassed and supplemented each other in assigning limits of variation to the several elements of the planetary orbits. The analytical tournament closed with the communication to the Academy by Laplace, in 1787, of an entire group of remarkable discoveries. It would be difficult, in the whole range of scientific literature, to point to a memoir of equal brilliancy with that published (divided into three parts) in the volumes of the Academy for 1784, 1785, and 1786. The long-sought cause of the " great inequality " of Jupiter and Saturn was found in the near approach to commensurability of their mean motions; it was demonstrated in two elegant theorems, independently of any except the most general considerations as to mass, that the mutual action of the planets could never largely affect the eccentricities and inclinations of their orbits; and the singular peculiarities detected by him in the Jovian system were expressed in the so-called " laws of Laplace." He completed the theory of these bodies in a treatise contained among the Paris *Memoirs* for 1788 and 1789; and the tables computed by Delambre from the data there supplied served, by their striking superiority to those hitherto available, to mark the profit derived from the investigation by practical astronomy. The year 1787 was rendered further memorable by Laplace's announcement, November 19th, of the dependence of lunar acceleration upon the secular changes in the eccentricity of the earth's orbit. The last apparent anomaly, and the last threat of instability, thus disappeared from the solar system.

With these brilliant performances the first period of Laplace's scientific career may be said to have closed. If he made no more striking discoveries in celestial mechanics, it was rather their subject-matter than his powers that failed. The general working of the great machine was now laid bare, and it needed a further advance of knowledge to render a fresh set of problems accessible to investigation. The time had come when the results obtained in the development and application of the law of gravitation by three generations of illustrious mathematicians might be collected in a single work, and presented from a single point of view. It was to this task that the second period of Laplace's activity was devoted. As a monument of mathematical genius applied to the celestial revolutions the *Mécanique Céleste* ranks second only to the *Principia* of Newton.

The *Exposition du Système du Monde* (Paris, 1796) has been styled by Arago " the *Mécanique Céleste* disembarrassed of its analytical paraphernalia." Not only the conclusions reached by geometers are stated, but the methods followed by them are indicated. To the excellence of this work the writer owed the place accorded to him in 1816 among the " forty " of the French Academy, of which institution he became president in the following year. The famous " nebular hypothesis " of Laplace makes its appearance in the *Système du Monde.*

The career of Laplace was one of scarcely interrupted prosperity. Admitted to the Academy of Sciences as an associate in 1773, he became a member in 1785, having, about a year previously, succeeded Bezout as examiner to the royal artillery. During a temporary access of revolutionary suspicion, he was removed from the commission of weights and measures; but the slight was quickly effaced by new honors. He was one of the first members, and became president, of the Bureau of Longitudes, took a prominent place at the Institute (founded in 1796), professed analysis at the École Normale, and aided in the organization of the decimal system. The publication of the *Mécanique Céleste* gained him world-wide celebrity, and his name appeared on the lists of all the principal scientific associations of Europe, including the Royal Society. But merely scientific distinctions by no means satisfied his ambition. He aspired to the rôle of a politician, and has left a memorable example of genius degraded to servility for the sake of a ribbon and a title. The ardor of his republican principles gave place, after the 18th Brumaire, to devotion toward the first consul, a sentiment promptly rewarded with the post of minister of the interior. His incapacity for affairs was, however, so flagrant that it became necessary to supersede him at the end of six weeks, when Lucien Bonaparte became his successor. His failure was consoled by elevation to the senate, of which body he became chancellor in September, 1803. He was at the same time named grand officer of the Legion of Honor, and obtained in 1813 the same rank in the new order of Reunion. The title of count he had previously acquired on the creation of the empire. Nevertheless he cheerfully gave his voice in 1814 for the dethronement of his patron, and his "suppleness" merited a seat in the chamber of peers, and, in 1817, the dignity of a marquisate. The memory of these tergiversations is perpetuated in his writings. The first edition of the *Système du Monde* was inscribed to the Council of Five Hundred; to the third volume of the *Mécanique Céleste* (1802) was prefixed the declaration that, of all the truths contained in the work, that most precious to the author was the expression of his gratitude and devotion toward the "pacificator of Europe;" upon which noteworthy protestation the suppression, in the editions of the *Théorie des Probabilités* subsequent to the restoration, of the original dedication to the emperor, formed a fitting commentary.

During the later years of his life, Laplace lived much at Arcueil, where he had a country-place adjoining that of his friend Berthollet. With his coöperation the Société d'Arcueil was formed, and he occasionally contributed to its *Memoirs*. In this peaceful retirement he pursued his studies with unabated ardor, and received with uniform courtesy distinguished visitors from all parts of the world. Here, too, he died, attended to the last by his physician Doctor Majendie, and his mathematical coadjutor Bouvard, March 5, 1812, having nearly completed his seventy-eighth year.

LAPLAND, or LAPPLAND, is the northwest portion of the continent of Europe, bounded west, north, and east by the North Atlantic, the Arctic Ocean, and the White Sea, and south partly by the White Sea, but mainly by a conventional line. It includes the northern parts of Norway, Sweden, and Finland, and the western part of the Russian government of Archangel. Of Russian Lapland only a very small portion lies outside of the Arctic circle; but in Swedish Lapland the southern confines descend as low as 64°. According to Frijs (in Petermann's *Mitth.*, 1870), the total area of Lapland may be estimated at 158,200 square miles, of which 16,073 miles belong to Norway, 48,898 to Sweden, 26,575 to Finland, and 61,654 to Russia.

Lapland is merely the land of the Lapps, or Laps, and does not constitute a geographical unity. The Scandinavian portion presents the usual characteristics of the mountain plateau of that peninsula—on one side the bold headlands, fjords, deep-grooved valleys, and glaciers of Norway, on the other the long mountain lakes and lake-fed rivers of Sweden. On the Swedish side the Lapp borders only come down to within from thirty to forty miles of the coast, where the rivers begin to lose the character of mountain streams. With the exception of Torne Lappmark, which is really part of Scandinavia, Finnish and Russian Lapland may be generally described as comparatively low country, broken by detached hills and ridges, one of which, the Umbdek Dunder, attains an elevation of 2,500 feet. Rivers and lakes abound. In the north of the Finnish region lies the great Enare or Inara (formerly Upper Imandra) Lake, with an area of 1,147 square miles; and the south is traversed by the countless head-waters of the Kemi, which falls into the Gulf of Bothnia to the east of the Swedish frontier. The largest of the rivers of Russian Lapland—or, as it is often called, the Kola peninsula—is the Tulom, which falls into the Arctic Ocean; and others of importance are the Pasvig, the Ponoi, and the Varsuga. Lake Imandra, or Inandra (in Lappish Aver), is about sixty-five miles long by eight or nine broad; Lake Nuoljaure is thirty-five miles by seven; and Guollejaure, Umbozero, Kontojarvi, and Pääjarvi are all of considerable extent. An opinion was long prevalent that there was a natural boundary of the most striking kind between the Arctic coast of Norwegian and that of Russian Lapland—that to the east of Jacob's river the harbors or fjords were ice-bound for six months of the year, while the influence of the Gulf Stream never allowed those to the west to be frozen. This, however, is not the case. The principal harbors on the Murman coast eastward to the mouth of the White Sea remain open like those of Norway.

Though Lapland contains vast stretches of desolate tundra and dreary swamp, the country as a whole has a certain quiet beauty, and in the wilder districts the scenery is wonderfully various in color and form. And, though it gives little scope for husbandry, Lapland is richly furnished with much that is serviceable to man. Not to mention the iron and copper mines, it still possesses great store of timber, pine and spruce and birch; though fruit-trees yield no fruit, there is abundance of edible berries; the rivers and lakes abound with salmon, trout, perch, and pike; myriads of water-fowl, ptarmigan, partridges, and capercailzie breed within its borders; and the cod, herring, halibut, and Greenland sharks of its seas give occupation to thousands of fishermen.

The chief characteristic of Lapland is its Arctic climate and the distribution of daylight and darkness. In the northern parts the longest day and the longest night last for three months each, and through the greater part of the country the sun does not set at midsummer or rise at midwinter.

The population of Lapland has been considerably recruited in modern times by immigrants from the south; but the country is still very sparsely peopled, and the Lapps still predominate. There are no towns, and the villages are not only few and insignificant, but often hardly less nomadic than the people, being shifted according to exigencies of fodder or fuel. Hammerfest, the "most northern town of the European continent," has only 2,100 inhabitants, and Kola (formerly Malmis), the principal settlement in Russian Lapland, does not now exceed 500.

The Lapps call their country *Sabme* or *Same*, and themselves *Samelats*—names almost identical with those employed by the Finns for their country and race, and probably connected with a root signifying "dark." Lapp is almost certainly a nickname imposed by foreigners, although some of the Lapps apply it contemptuously to those of their countrymen whom they think to be less civilized than themselves.

In Sweden and Finland the Lapps are usually divided into fisher, mountain and forest Lapps. In Sweden the first class includes many impoverished mountain Lapps. The principal colony has its summer quarters on the Stuor-Lule Lake, possesses good boats and nets, and, besides catching and drying fish, makes money by the shooting of wild fowl and the gathering of eggs. When he has acquired a little means it is not unusual for the fisher to settle down and reclaim a bit of land. The mountain and forest Lapps are the true representatives of the race. In the wandering life of the mountain Lapp his autumn residence, on the borders of the forest district, may be considered as the central point; it is there that he erects his *njalla*, a small wooden storehouse raised high above the ground by one or more piles. At the beginning of November, a little sooner or later, he begins to wander south or east into the forest land, and in the course of the winter he may visit, not only such places as Jokkmokk and Arjepluog, but even Gefle, Upsala, or Stockholm. About the beginning of May he is back at his njalla, but as soon as the weather grows warm he pushes up to the mountains, and there throughout the summer pastures his herds and prepares his store of cheese. By autumn or October he is busy at his njalla killing the surplus reindeer bulls and curing meat for the winter. From the mountain Lapp the forest (or, as he used to be called, the spruce-fir) Lapp is mainly distinguished by the narrower limits within which he pursues his nomadic life. He never wanders outside of a certain district, in which he possesses hereditary rights, and maintains a series of camping grounds which he visits in regular rotation. In May or April he lets his reindeer loose, to wander as they please; but immediately after midsummer, when the mosquitoes become troublesome, he goes to collect them. Catching a single deer and "belling" it, he drives it through the wood; the other deer, whose instinct leads them to gather into herds for mutual protection against the mosquitoes, are attracted by the sound. Should the summer be very cool and the mosquitoes few, the Lapp finds it next to impossible to bring the creatures together. About the end of August they are again let loose, but they are once more collected in October, the forest Lapp during winter pursuing the same course of life as the mountain Lapp.

In Norway there are three classes—the sea Lapps, the river Lapps, and the mountain Lapps, the first two settled, the third nomadic. The mountain Lapps have, on the whole, a rather ruder and harder life than the same class in Sweden. Previous to 1852, when they were forbidden by imperial decree, they were wont in winter to move south across the Russian frontiers. It is seldom possible for them to remain more than three or four days in one spot. Flesh is their favorite, in winter almost their only, food, though they also use reindeer milk, cheese, and rye or barley cakes. The sea Lapps are in some respects hardly to be distinguished from the other coast dwellers of Finmark. Their food consists mainly of cooked fish. The river Lapps, many of whom, however, are descendants of Quains or Finns proper, breed cattle, attempt a little tillage, and intrust their reindeer to the care of the mountain Lapps.

In Finland there are comparatively few Laplanders, and the great bulk of them belong to the fisher class.

The Russian Lapps are also for the most part fishers, as is natural in a district with such an extent of coast and such a number of lakes, not to mention the advantage which the fisher has over the reindeer keeper in connection with the many fasts of the Greek Church. They maintain a half nomadic kind of life, very few of them having become regular settlers in the Russian villages.

The ethnographical position of the Lapps has not been clearly determined, though it is evident they can no longer be classified with the Finns. They are, as has been seen, far from a numerous people, and within the historical period they have considerably recruited themselves from neighboring races. Shortness of stature is their most obvious characteristic, though in regard to this much exaggeration has prevailed. The body is usually of fair proportions, but the legs are rather short, and in many cases somewhat bandy. Dark, swarthy, yellow, copper-colored are all adjectives employed by competent observers to describe their complexion—the truth being that their habits of life do not conduce either to the preservation or display of their natural color of skin, and that some of them are really fair, and others, perhaps the majority, really dark. The color of the hair, too, ranges from blonde and reddish to a bluish or grayish black; and the eyes are black, hazel, blue, or gray. The shape of the skull is the most striking peculiarity of the Lapp. He is the most brachycephalous type of man in Europe, perhaps in the world. According to Virchow, the women in width of face are more Mongolian-like than the men, but neither in men nor women does the opening of the eye show any true obliquity. In children the eye is large, open, and round. The nose is always low and broad, more markedly retroussé among the females than the males. Wrinkled and puckered by exposure to the weather, the faces even of the younger Lapps assume an appearance of old age. The muscular system is usually well developed, but there is deficiency of fatty tissue, which affects the features (particularly by giving relative prominence to the eyes) and the general character of the skin. The thinness of the skin, indeed, can but rarely be paralleled among other Europeans. Among the Lapps, as among other lower races, the index is shorter than the ring finger.

The Lapps are a quiet, inoffensive people. Crimes of violence are almost unknown among them, and the only common breach of law is the killing of tame reindeer belonging to other owners. In Russia, however, they have a bad reputation for lying and general untrustworthiness, and drunkenness is well-nigh a universal vice. In Scandinavia laws have been directed against the importation of intoxicating liquors into the Lapp country since 1723.

Superficially at least the great bulk of the Lapps have been Christianized—those of the Scandinavian countries being Protestants, those of Russia members of the Greek Church. In education the Scandinavian Lapps are far ahead of their Russian brethren, to whom reading and writing are arts as unfamiliar as they were to their pagan ancestors. The general manner of life is patriarchal. The father of the family has complete authority over all its affairs; and on his death this authority passes to the eldest son. Parents are free to disinherit their children; and if a son separates from the family without his father's permission he receives no share of the property except a gun and his wife's dowry.

By the very circumstances of their position the Lapps are of necessity conservative in most of their habits, many of which can hardly have altered since the first taming of the reindeer. But the strong current of mercantile enterprise has carried a few important products of southern civilization into their huts.

Linguistically the Lapps belong to the great Uralo-Altaic family; the similarity of their speech to Finnish is evident on the surface. It is broken up into very distinct and even mutually unintelligible dialects, the origin of several of which is, however, easily found in the political and social dismemberment of the people.

LA PLATA, the capital of the Argentinian province of Buenos Ayres, was founded in 1882, after Buenos Ayres City, from which it is about thirty miles southeast, had been made the federal capital. The new city was rapidly built, with wide streets, that are now mostly paved, and over a score of open squares; the central portion is lit with the electric light, the rest with kerosene lamps, and there is a service of tramways. The only buildings of note are the handsome capitol and other offices of the government, an observatory, several chapels, and a fine railway station. There are scores of hotels, inns, and cafés. The city has a college, and, seven miles away, a hospital and an asylum for the insane. Among the manufactories already established is one of cotton and woolen tissues. A canal connects a harbor which has been constructed at La Plata with a larger outer harbor at Ensenada, on the La Plata river. Population (1901) of municipality (including, however, Ensenada and a country district of nearly sixty square miles), 61,000.

LA PLATA, RIO DE, a wide estuary of South America, between Uruguay on the north and the Argentine Republic on the south, through which the waters of the Paraná and the Uruguay sweep down to the ocean. It is about 200 miles long, 20 wide at Buenos Ayres, and 140 miles broad at its mouth, between Maldonado and Cape San Antonio. The northern shore is somewhat steep and lofty, but that along the province of Buenos Ayres is low and flat, with wide sandbanks that prevent ships from approaching closely to the shore. The estuary has thus no shelter from tempestuous storms that come from the southwest; and even the only good harbor, that at Montevideo, is open to the southeast. The affluents of the La Plata drain an area estimated at 1,600,000 square miles, and the outflow of the estuary is calculated at about 52,000,000 cubic feet per minute—a volume exceeded only by that of the Amazons; the yellow muddy stream is recognizable sixty miles out at sea. The estuary was discovered in 1515 or 1516 by Diaz de Solis, who was shortly afterward roasted and eaten by the Indians on its bank. See also PARAGUAY and URUGUAY.

LA PORTE, chief city of La Porte county, Ind., is situated at the intersection of three railways, twelve miles south of Lake Michigan, and about sixty miles southeast of Chicago. Surrounded by a fertile agricultural region, it carries on a considerable trade, and has manufactories of agricultural implements, foundries, and various mills. The vicinity has become a favorite summer residence, on account of its beautiful lakes, which in winter supply large quantities of clear ice for the Chicago and southern markets. The population (1900) was 7,113.

LAPPENBERG, JOHANN MARTIN, a German historical writer, was born July 30, 1794, at Hamburg, and died in 1865.

LAPWING, Anglo-Saxon *Hleápewince* (=" one who turns about in running or flight"), a bird, the *Vanellus vulgaris* or *V. cristatus* of modern ornithologists. In the temperate parts of the Old World this species is, perhaps, the most abundant of the plovers, breeding in greater or fewer numbers in almost every suitable place from Ireland to Japan—the majority migrating toward winter to southern countries, as the Punjab, Egypt, and Barbary—though in the British Islands some are always found at that season, chiefly about estuaries. As a straggler it has occurred within the Arctic Circle (as on the Varanger Fjord in Norway), as well as in Iceland and even Greenland, while it not infrequently appears in Madeira and the Azores. Conspicuous as the strongly contrasted colors of its plumage, and its very peculiar flight, make it, one may well wonder at its success in maintaining its ground when so many of its allies have been almost exterminated, for the Lapwing is the object, perhaps, of greater persecution than any other European bird that is not a plunderer. Its eggs—the well known "plovers' eggs" of commerce—are taken by the thousand or ten thousand, and, worse than this, the bird, wary and wild at other times of the year, in the breeding season becomes easily approachable, and is (or used to be) shot down in enormous numbers, to be sold in the markets for "golden plover." Its growing scarcity as a species was consequently, in Great Britain, very perceptible until an act of parliament frightened people into letting it alone, and its numbers have since then perceptibly increased, to the manifest advantage of many classes of the community—those who would eat its eggs, those who would eat its flesh (at the right time of the year), as well as the agriculturists whose lands it frequented; for it is admitted on all hands that no bird is more completely the farmer's friend. What seems to be the secret of the Lapwing holding its position in spite of slaughter and rapine is the adaptability of its nature to various kinds of localities. It will find sustenance for itself and its progeny equally on the driest soils as on the fattest pastures; upland and fen, arable and moorland, are alike to it, provided only the ground be open enough. The wailing cry and the frantic gestures of the cock bird in the breeding season will tell any passer-by that a nest or brood is near; but, unless he knows how to look for it, nothing save mere chance will enable him to find it. Yet by practice those who are acquainted with the bird's habits will accurately mark the spot whence the hen silently rises from her treasure, and, disregarding the behavior of the cock, which is intended to delude the intruder, will walk straight to one nest after another as though they knew beforehand the exact position of each. The nest is a slight hollow in the ground, wonderfully inconspicuous even when deepened, as is usually the case, by incubation, and the black-spotted olive eggs (four in number) are almost invisible to the careless or untrained eye, unless it should happen to glance directly upon them.

LAR, a city of Persia, capital of Láristán, 174 miles from Shiráz, and 127 from the coast at Mogu Bay. Lár was once a flourishing place, but a large portion is now in ruins, and the population is reduced to about 12,000.

LARAMIE CITY, the capital of Albany county, Wyoming, is situated 57 miles west-northwest of Cheyenne, on the Union Pacific railroad. It is picturesquely located at an elevation of over 7,000 feet above sea level, in the midst of beautiful mountain scenery. Among the public buildings are the State University (cost $85,000), and the $30,000 court-house, and an Episcopal cathedral is in course of construction. The city contains eight churches, two handsome school buildings, and a public library; is lighted by electricity, and supplied with water by an aqueduct leading from springs in the mountains and furnishing 4,000,000 gallons daily. There is a sewer system, police and fire departments, and a street railroad built in 1890. The municipal receipts for the year ending May 1, 1890, were $26,953, and the expenditures $24,462. The assessed valuation is $2,000,000, the true valuation double that amount, and the rate of city tax is fifty cents on the $100. Official population (1900), 8,207.

LARCENY. See THEFT.

LARCH, a name applied to a small group of coniferous trees, of which the common larch of Europe is taken as the type. The members of the genus *Larix* are distinguished from the firs, with which they were formerly placed, by their deciduous leaves, scattered singly, as in *Abies*, on the young shoots of the season, but on all older branchlets growing in whorl-like tufts, each surrounding the extremity of a rudimentary or abortive branch; from cedars (*Cedrus*) they differ, not only in the deciduous leaves, but in the cones, the scales of which are thinner toward the apex, and are persistent, remaining attached long after the seeds are discharged. The trees of the genus are closely allied in botanic features, as well as in general appearance, so that it is sometimes difficult to assign to them determinate specific characters, and the limit between species and variety is not always very accurately defined. Nearly all are natives of Europe, or the northern plains and mountain ranges of Asia and North America, though one occurs only on the Himalaya; a somewhat aberrant form, usually placed in a separate sub-genus, is peculiar to north China and Japan.

The larch abounds on the Alps of Switzerland, on which it flourishes at an elevation of 5,000 feet, and also on those of Tyrol and Savoy, on the Carpathians, and in most of the hill regions of central Europe; it is likewise found on parts of the Apennine chain, but is not indigenous to the Pyrenees, and in the wild state is unknown in the Spanish peninsula.

The larch, from its lofty straight trunk and the high quality of its wood, must be regarded as one of the most important of coniferous trees; its growth is extremely rapid, the stem attaining a large size in from sixty to eighty years, while the tree yields good useful timber at forty or fifty; it forms firm heartwood at an early age, and the sapwood is less perishable than that of the firs, rendering it more valuable in the young state.

The European larch has long been introduced into the United States, where, in suitable localities, it flourishes luxuriantly. Of late years some small plantations have been made in America with an economic view, the tree growing much faster, and producing good timber at an earlier age, than the native hackmatack, while the wood is less ponderous, and therefore more generally applicable.

The genus is represented in the eastern parts of North America by the hackmatack (*L. Americana*), of which there are several varieties, two so well marked that they are by some botanists considered specifically distinct. In one (*L. microcarpa*) the cones are very small, rarely exceeding one-half inch in length, of a roundish-oblong shape; the scales are very few in number, crimson in the young state, reddish-brown when ripe; the tree much resembles the European larch in general appearance, but is of more slender growth; its trunk is seldom more than two feet in diameter, and rarely above eighty feet high; this form is the red larch the *épinette rouge* of the French Canadians. The black larch (*L. pendula*) has rather large cones, of an oblong shape, about three-fourths of an inch long, purplish or green in the immature state, and dark brown when ripe, the scales somewhat more numerous; the bracts all shorter than the scales. The bark is dark bluish-gray, smoother than in the red larch, on the trunk and lower boughs often glossy; the branches are more or less pendulous and very slender. The red larch grows usually on higher and drier ground, ranging from the Virginian mountains to the shores of Hudson's Bay; the black larch is found often on moist land and even in swamps. The hackmatack is one of the most valuable timber trees of America; it is in great demand in the ports of the St. Lawrence for shipbuilding, the best vessels built in British America having their frames wholly or partially constructed of this fine wood. It is far more durable than any of the oaks of that region, is heavy and close grained, and much stronger, as well as more lasting, than that of the pines and firs of Canada. In many parts all the finer trees have been cut down, but large woods of it still exist in the less accessible districts; it abounds especially near Lake St. John, and in Newfoundland is the prevalent tree in some of the forest tracts: it is likewise common in Maine and Vermont. In the timber and building yards the "red" hackmatack is the kind preferred, the produce probably of *L. microcarpa;* the "gray" is less esteemed; but the varieties from which these woods are obtained cannot always be traced with certainty. Several fine specimens of the red larch exist in English parks, but its growth is much slower than that of *L. europœa*, and it has never been planted on a large scale; the more pendulous forms of *L. pendula* are elegant trees for the garden. The hackmatacks might perhaps be grown with advantage in places too wet for the common larch.

LARD is the melted and strained fat of the common hog. The bulk of the lard of commerce is obtained from the abdominal fat of the animal; but in the preparation of inferior qualities fatty scraps of all kinds which result from the preparation of pork are melted up, and occasionally entire flanks of pigs are treated for the fat they yield. Ordinary lard is a pure white fat of the consistency of butter, having a faint characteristic taste, and scarcely any odor. It melts at between 78° to 88° Fahr., has a specific gravity of 0.915, and consists of 62 per cent. of fluid fat (olein or lard oil), and 38 per cent. of the hard fats palmitine and stearine. If perfectly pure it has no tendency to become rancid; but there is generally sufficient impurity present to develop a change in the olein, which gradually exhibits itself by a yellow color and a rancid odor and taste. Lard is an article of considerable importance in commerce; it is calculated that the annual produce of the substance in the United States of America alone is not less than 5,000,000 hundredweights. Its preparation is conducted in connection with the great pork-curing and packing establishments, mostly centered in Chicago, Cincinnati, St. Louis, Milwaukee, Louisville, Indianapolis, Kansas City—Chicago alone now monopolizing about one-half of the American trade. In these establishments the fat is "rendered" in large vats heated by coils or worms of steam pipes, each charge being completely melted in from ten to twelve hours. The greaves or cracklings which remain are used for making "dog biscuits," etc. The finest lard is prepared from the "leaf" fat of the abdominal cavity, and passes into commerce as "prime steam lard." The intestinal fat, trimmings, and refuse yield No. 2 lard, which is mostly sent to the European market. The summer-killed pigs yield on an average thirty-four pounds of lard, while the winter-killed animals produce about thirty-seven pounds, but in the case of selected animals these figures may rise to forty-five pounds and fifty-four pounds respectively. The uses of lard are numerous: it is largely employed by biscuit and pastry bakers and in domestic cookery; it is used in the dressing and currying of leather; it is an important article in pharmacy for ointments, plasters, and suppositories; it forms a principal ingredient in many pomades and preparations for the toilet; and it is the source of the important lard oil and "solar stearine" noted below. Lard is occasionally adulterated with water up even to 20 per cent., with starch, chalk, plaster of paris, baryta, etc. Such falsifications, owing to the nature of the substance, are easily detected:—the water by bringing the substance gently to the melting point when it separates; starch by the characteristic reaction with iodine; and mineral substance by the ash remaining after the burning of the fat.

Lard oil is the limpid, clear, colorless oil expressed by pressure and gentle heat from lard, leaving a solid, glistening, and crystalline residue, known in commerce as "solar stearine," which is useful in candle making, but is also used to adulterate spermaceti. Lard oil has now an important function in industry, being principally employed for the oiling of wool and in lubrication. It is also a good deal consumed in the falsification of more valuable oils, for which its neutral properties well adapt it: and it in turn is adulterated with cottonseed oil, etc.

LARDNER, DIONYSIUS, a prolific scientific writer, was born at Dublin, April 3, 1793. He settled at Paris.

and continued to reside there till within a few months of his death, which took place at Naples, April 29, 1859.

LARDNER, Nathaniel, author of *The Credibility of the Gospel History*, was born at Hawkhurst, Kent, England, in 1684. He died at Hawkhurst on July 24, 1768.

LAREDO, a frontier town of Texas, the county seat of Webb County, lies on the Rio Grande, opposite the Mexican town of Nuevo Laredo, and near the American town of San Antonio. The chief trade of the town is in wool and cattle. There is a convent here and several educational institutions. The town has of late years been steadily growing. Population (1900), 13,429.

LARES were Roman deities, whose character and worship share in the obscurity that envelops all antique Roman religion. They belonged to the cultus of the dead, from which so much of Roman and Greek religion was derived; they were the deified ancestors still living in their graves in the house, and worshiped by the family as their guardians and protectors. But the dead were powerful also to do harm, unless they were duly propitiated with all the proper rites; they were spirits of terror as well as of good; in this fearful sense the names *Lemures* and still more *Larvæ* were appropriated to them. The name Lar has been thought to be an Etruscan word, meaning "Lord;" it is a common personal name or title in Etruria. We find certainly, from a very early time, a distinction between *Lares privati* and *Lares publici*. The former were worshiped in the house by the family alone, and the *Lar familiaris* was conceived as the head of the family and of the family cultus. The *Lares publici* belonged to the state religion; and their worship, after having fallen into neglect, was restored by Augustus and to some extent remodeled. It is therefore difficult to distinguish how far the known rites of the cultus are ancient; but it seems certain that the *genius* of Augustus, as refounder of the state, was added, and that the original *Lares præstites* were two in number. Schwegler and others have maintained that this pair are the twin brothers so frequent in early religions, the Romulus and Remus of the Roman foundation legend; that the tale of the twins is in most of its elements derived from the religion of the two Lares; that Acca Larentia, the fostermother of the twins, is the same as Lara, Larunda, Mania, or Muta, the mother of the Lares; and that the Larentalia, celebrated on December 23d, was a feast of the Lares. But the two sets of legends must be strictly distinguished: the difference in the quantity of the opening syllable shows that Larentia has no connection with Larunda and the Lares; the Larentalia was a festival of Jupiter and Acca Larentia, in which the Lares had no place; and Mommsen argues that Remus was a late addition to the foundation legend, in which originally Romulus alone was known. As restored by Augustus, the *Lares præstites* were the guardians of the state and protectors of its unity; and, in lesser circles, every division of the city had likewise its *Lares compitales*, now three in number, who had their own ædicula at the cross roads and their special festival, *Compitalia*. The temple of the city Lares (*sacellum Larum*) was near the top of the Via Sacra.

LARGILLIÈRE, Nicolas, perhaps the most distinguished portrait painter of the age of Louis XIV., was born at Paris, October 20, 1656; he died on March 20, 1746.

LARISSA, the most important town of Thessaly, is situated in a rich agricultural district on the right bank of the Salambria (Peneius), about thirty-five miles northwest of Volo. The population of the province (1897) was 181,542; of the town, 15,373.

LÁRISTÁN, a province of Persia, bounded by Faristán on the west and northwest, by Kirmán on the east and northeast, by the Persian Gulf on the south. It has an extreme length and breadth of 210 and 120 miles respectively, with an area of 20,000 square miles. Láristán is one of the least productive provinces in Persia, consisting mainly of mountain ranges in the north and east, and of arid plains varied with rocky hills and salt or sandy valleys stretching thence to the coast. In the highlands there are some fertile upland tracts, producing corn, dates, and other fruits; and there the climate is genial. But elsewhere it is extremely sultry, and on some low-lying coast lands subject to malaria. Good water is everywhere so scarce that but for the rain preserved in cisterns the country would be mostly uninhabitable. Population, about 90,000.

LARK, a bird's name (perhaps always, but now certainly) used in a rather general sense, the specific meaning being signified by a prefix, as Skylark, Titlark, Woodlark, and so forth. It seems to be nearly conterminous with the Latin *Alauda* as used by older authors; and, though this was to some extent limited by Linnæus, several of the species included by him under the genus he so designated have long since been referred elsewhere. By Englishmen the work Lark, used without qualification, almost invariably means the Skylark, *Alauda arvensis*, which, as the best known and most widely spread species throughout Europe, has been invariably considered the type of the genus. It scarcely needs description. Of all birds it holds unquestionably the foremost place in our literature, and there is hardly a poet or poetaster who has not made it his theme, to say nothing of the many writers of prose who have celebrated its qualities in passages that will be remembered so long as our language lasts. It is also one of the most favorite cage birds, as it will live for many years in captivity, and, except in the season of molt, will pour forth its thrilling song many times in an hour for weeks or months together, while its affection for its owner is generally of the most marked kind. Difficult as it is to estimate the comparative abundance of different species of birds, there would probably be no error in accounting the Skylark the most plentiful of the class in western Europe. Not only does it frequent almost all unwooded districts in this quarter of the globe, making known its presence throughout spring and summer, everywhere that it occurs, by its gladsome and heart-lifting notes, but, unlike most birds, its numbers increase with the spread of agricultural improvement, and since the beginning of the century the extended breadth of arable land in Great Britain must have multiplied many-fold the Lark population of the country. Nestling chiefly in the growing corn, its eggs and young are protected in a great measure from all molestation; and, as each pair of birds will rear several broods in the season, their produce on the average may be set down as at least quadrupling the original stock—the eggs in each nest varying from five to three.

The majority of young Larks seem to leave their birthplace as soon as they can shift for themselves, but what immediately becomes of them is one of the many mysteries of bird-life that have not yet been penetrated. When the stubbles are cleared, old and young congregate in flocks; but the young then seen appear to be those only of the later broods. In the course of the autumn they give place to others coming from more northerly districts, and then as winter succeeds in great part vanish, leaving but a tithe of the numbers previously present. On the approach of severe weather, in one part of the country or another, flocks arrive in Great Britain, undoubtedly from the Continent, which in magnitude cast into insignificance all those that have hitherto inhabited the district. On the east coast of both Scotland and England this immigration has been several times noticed as occurring in a constant stream for as many as three days in succession. Further inland the birds are observed "in numbers simply incalculable," and "in countless hundreds." On such occasions the bird-catchers are busily at work with their nets or snares, so that 20,000 or 30,000 Larks are often sent together to the London market, and at the lowest estimate £2,000 worth are annually sold there. During the winter of 1867–68, 1,255,500 Larks, valued at £2,260, were taken into the town of Dieppe. The same thing happens in various places almost every year, and many persons are apt to believe that thereby the species is threatened with extinction. When, however, it is considered that, if these birds were left to continue their wanderings, a large proportion would die of hunger before reaching a place that would supply them with food, and that of the remainder an enormous proportion would perish at sea in their vain attempt to find a settlement, it must be acknowledged that man by his wholesale massacres, which at first seems so brutal, is but anticipating the act of Nature, and on the whole probably the fate of the Larks at his hands is not worse than that which they would encounter did not his nets intervene.

The Skylark's range extends across the Old World from the Faroe to the Kurile Islands. In winter it occurs in North China, Nepaul, the Punjab, Persia, Palestine, Lower Egypt, and Barbary. It sometimes strays to Madeira, and has been killed in Bermuda, though its unassisted appearance there is doubtful. It has been successfully introduced on Long Island in the State of New York, and into New Zealand—in which latter it is likely to become as troublesome a denizen as other subjects upon which Acclimatization Societies have exercised their meddlesome activity.

The Mud-Lark, Rock-Lark, Titlark, and Tree-Lark are PIPITS, (*q.v.*) The Grasshopper-Lark is one of the aquatic WARBLERS (*q.v.*), while the Meadow-Lark of America is an ICTERUS. Sand-Lark and Sea-Lark are likewise names often given to some of the smaller members of the *Limicolæ*.

LARNACA, or LARNICA. See CYPRUS.

LA ROCHEFOUCAULD, FRANÇOIS DE, the greatest maxim-writer of France, one of her best memoir-writers, and perhaps the most complete and accomplished representative of her ancient nobility, was born at Paris in the Rue des Petits Champs on September 15, 1613. He had a circle of devoted friends; he was recognized as a moralist and man of letters of the first rank; he might have entered the Academy for the asking; and in the altered measure of the times, his son, the Prince de Marcillac, to whom some time before his death he resigned his titles and honors, enjoyed a considerable position at court. Above all, La Rochefoucauld was generally recognized by his contemporaries from the king downward as a type of the older noblesse as it was before the sun of the great monarch dimmed its brilliant qualities. This position he has retained until the present day. He died at Paris on March 17, 1680.

LA SALLE, chief city of La Salle county, Ill., is situated on the right bank of the Illinois river, navigable up to this point, about eighty miles southwest of Chicago, with which it is connected by the Illinois and Michigan Canal as well as by rail. La Salle is a rising commercial city, with manufactories of glass, sulphuric acid, and soda-ash, and some export of ice, as well as extensive zinc rolling mills. The supply of bituminous coal in the vicinity is large, the output of the mines being 1,000,000 tons annually. The population in 1900 was 10,446.

LA SALLE, ROBERT CAVELIER, SIEUR DE, a French explorer in North America, was born at Rouen in November, 1643. He became a settler in Canada, and about 1669, leaving his trading post at Lachine, above Montreal, he sought to reach China by way of the Ohio, supposing, from the reports of Indians, this river to flow into the Pacific. He made explorations of the country between the Ohio and the lakes, but, when Joliet and Marquette made it evident that the main river Mississippi emptied in the Gulf of Mexico, he conceived a vast project for extending the French power in the lower Mississippi valley, and thence attacking Mexico. He obtained extensive grants from the French Government, rebuilt Fort Frontenac, established a post above Niagara Falls, and built a small vessel, in which he sailed up the lakes to Green Bay. Thence, dispatching his vessel freighted with furs, he proceeded with the rest of the party, in boats and on foot, to the Illinois river, near the head of which he began a post called Fort Crêvecœur, and a vessel in which to descend the Mississippi. Not hearing of his vessel on the lakes, he detached Hennepin, with one companion, to ascend the Mississippi from the mouth of the Illinois, and, leaving Tonty, with five men, at Fort Crêvecœur, he returned by land to Canada. Toward the close of 1681 La Salle, with a party in canoes, again reached the head of Lake Michigan, at the present site of Chicago, and, making the long portage to the Illinois, descended it to the Mississippi, which he followed to its mouth, where he set up a cross and the arms of France, April 9, 1682. La Salle fell sick on his voyage up the river, and sent on intelligence of his success, which was carried to France by Father Membré, and was published in Hennepin's work in 1683. When La Salle reached France, projects were taken up by the government for an expedition against the rich mining country of northern Mexico. Plans were submitted by La Salle and by Peñalosa, a renegade Spaniard, who, while governor of New Mexico in 1662, had penetrated apparently to the Mississippi. La Salle was accordingly sent out in July, 1684, with four vessels and a small body of soldiers, ostensibly to found an establishment at the mouth of the Mississippi, but really to push on and secure a favorable base of operations, and gain the aid of the Indians against the Spaniards, while awaiting a more powerful force under Peñalosa. The design was so well masked, and subsequently misrepresented, that he is generally said to have been carried beyond the Mississippi by the treachery of Beaujeu, a naval officer commanding one of the vessels. After running along the coast, La Salle returned to Espiritu Santo Bay, Texas. There he landed his soldiers, but lost one vessel with valuable stores. He refused Beaujeu's offer to obtain aid for him from the West Indies, and when that officer, according to his orders, sailed back, La Salle put up a rude fort. Then for two years, from January, 1685, to January, 1687, he wasted the time in aimless excursions by land, never getting beyond the present limits of Texas, and making no attempt to explore the coast or reach the Mississppi with his remaining vessel. His colonists and soldiery dwindled away; no reëforcements or expedition under Peñalosa arrived: and in January, 1687, leaving part of his force at Fort St. Louis, he set out with the rest to reach Canada by way of the Mississippi to obtain relief. His harshness and arbitrary manner had provoked a bitter feeling among his followers, and he was assassinated on March 19th, near the Trinity river. Some of the survivors reached Tonty's post on the Arkansas, and returned to France by way of Canada. The party left at the fort were nearly all cut off by the Indians, a few survivors having been rescued by a Spanish force sent to root out the French.

LASCAR, an Anglo-Persian term (from *lashkar*, an army), which formerly meant a non-combatant, or public follower of the ordnance department. Later on it came to mean any supernumeraries, and especially the native sailors engaged to supplement the crews of European vessels in Eastern waters. The term is at present applied generally to the seafaring population of the Indian seaboard manning British vessels sailing between England and the East.

LASCARIS, Constantine, an eminent Greek scholar, was a member of the family which in the thirteenth century had furnished three emperors of Nicæa, and was born at Constantinople, but in what year is unknown. He died in 1493.

LASCARIS, Joannes or Janus, a celebrated teacher, surnamed Rhyndacenus, from the river Rhyndacus in Bithynia, his native province, was born about 1445. He died at Rome in 1535.

LAS CASAS, Bartolomé de, for some time bishop of Chiapa in Mexico, and known to posterity as "The Apostle of the Indies," was a native of Seville, where he was born in 1474. In 1535 Las Casas successfully remonstrated with Philip II. against the financial project for selling the reversion of the "ecomiendas"—a project which would have involved the Indians in hopeless bondage. In July of the following year he died at Madrid, whither he had gone to urge (and with success) the necessity of restoring a court of justice which had been repressed in Guatemala.

LASCO, or Lascki, John. See Alasco.

LASSA. See Lhasa.

LAS CASES, Emmanuel Dieudonne, Comte de, the historiographer and companion of Napoleon at St. Helena, was born in 1766, near Revel in Languedoc. He was a lieutenant in the navy before the Revolution, but then fled from France, and supported himself in England by private teaching. After Napoleon became consul, Las Cases established himself as a bookseller in Paris. A work that he wrote, *Atlas historique* (1803–4), attracted the attention of the emperor, who made him a baron, and employed him in the administration. After Waterloo he obtained leave to share the exile of Napoleon in St. Helena, and there the ex-emperor dictated to him a part of his Memoirs. In 1816 Las Cases was sent back to Europe, and after Napoleon's death published *Memorial de Ste-Helene* (8 vols. 1821–23), of which O'Meara's *Napoleon in Exile* is a kind of continuation. Both works attack Sir Hudson Lowe, Napoleon's keeper, charging him with harshness toward his prisoner. Las Cases died May 15, 1842.

LASCO, or Lascki, John. See Alasco.

LASSA. See Lhasa.

LASSALLE, Ferdinand, the originator of the social-democratic movement in Germany, was born at Breslau in 1825. Like Karl Marx, the chief of international socialism, he was of Jewish extraction. His father, a prosperous merchant in Breslau, intended Ferdinand for a business career, and with this view sent him to the commercial school at Leipsic; but the boy, having no liking for that kind of life, got himself transferred to the university, first at Breslau, and afterward at Berlin. At Berlin Lassalle became a favorite in some of the most distinguished circles; even the veteran Humboldt was fascinated by him, and used to call him the *Wunderkind*. Here it was, also, toward the end of 1845, that he met the lady with whom his life was to be associated in so remarkable a way, the Countess Hatzfeldt. She had been separated from her husband for many years, and was at feud with him on questions of property and the custody of their children. With characteristic energy Lassalle attached himself to the cause of the countess, whom he believed to have been outrageously wronged, made a special study of law, and, after bringing the case before thirty-six tribunals, reduced the powerful count to a compromise on terms most favorable to his client. The process, which lasted ten years, gave rise to not a little scandal, especially that of the *Cassettengeschichte*, which pursued Lassalle all the rest of his life. This "affair of the casket" arose out of an attempt by the countess' friends to get possession of a bond for a large life annuity settled by the count on his mistress, a Baroness Meyendorf, to the prejudice of the countess and her children. Two of Lassalle's comrades succeeded in carrying off the casket, which contained the lady's jewels, from the baroness' room at a hotel in Cologne. They were prosecuted for theft, one of them being condemned to six months' imprisonment; Lassalle, accused of moral complicity, was acquitted on appeal. He was not so fortunate in 1849, when he underwent a year's durance for resistance to the authorities at Düsseldorf during the troubles of that stormy period. But going to prison was quite a familiar experience in Lassalle's life. Till 1859 Lassalle resided mostly in the Rhine country, prosecuting the suit of his friend the countess, finishing the work on Heraclitus, which was not published till 1858, and taking little part in political agitation, but ever a helpful friend of the working men. He was not allowed to live in Berlin because of his connection with the disturbances of '48. In 1859, however, he entered the city disguised as a carter, and finally, through the influence of Humboldt with the king, got permission to stay there. The same year he published a remarkable pamphlet on the *Italian War and the Mission of Prussia*, in which he came forward to warn his countrymen against going to the rescue of Austria in her war with France. He pointed out that if France drove Austria out of Italy she might annex Savoy, but could not prevent the restoration of Italian unity under Victor Emmanuel. France was doing the work of Germany by weakening Austria, the great cause of German disunion and weakness; Prussia should form an alliance with France in order to drive out Austria, and make herself supreme in Germany. After their realization by Bismarck these ideas have become sufficiently commonplace; but they were nowise obvious when thus published by Lassalle. In 1861 he published a great work in two volumes, the *System of Acquired Rights.*

Hitherto Lassalle had been known only as the author of two learned works, as connected with an extraordinary lawsuit which had become a wide-spread scandal, and as a young man of whom even the most distinguished veterans expected great things. Now began the short-lived activity which was to give him an historical significance. It was early in 1862, when the struggle of Bismarck with the Prussian liberals was already begun. Lassalle, who had always been a democrat of the most advanced type, saw that an opportunity had come for asserting a third great cause—that of the workingmen—which would outflank the liberalism of the middle classes, and might even command the sympathy of the government. His political programme was, however, entirely subordinate to the social, that of bettering the condition of the working-classes, for which he believed the schemes of Schulze-Delitzsch were utterly inadequate. Lassalle flung himself into the career of agitator with his accustomed vigor. His worst difficulties were with the workingmen themselves, among whom he met the most discouraging apathy. For a war to the knife with the liberal press he was quite prepared, and he accepted it manfully. His mission as organizer and emancipator of the working class lasted only two years and a half. In that period he issued about twenty separate publications, most of them speeches and pamphlets, but one of them, that against Schulze-Delitzsch, a considerable treatise, and all full of keen and vigorous thought. He founded the "Allgemeiner Deutscher Arbeiterverein," was its president and almost single-handed champion, conducted its affairs, and carried on a vast correspondence, not to mention about a dozen state prosecutions in which he was during that period involved. Berlin, Leipsic, Frankfort, and the industrial centers on the Rhine were the chief scenes of his activity. His greatest success was on the Rhine, where in the summers of 1863 and 1864 his travels as missionary of the new gospel resembled a triumphal procession. The agitation was growing rapidly, but he had achieved little substantial success when a most unworthy death closed his career.

While posing as the Messiah of the poor, Lassalle was a man of decidedly fashionable and luxurious habits. His suppers were well known as among the most exquisite in Berlin. It was the most piquant feature of his life that he, one of the gilded youth, a connoisseur in wines, and a learned man to boot, had become agitator and the champion of the workingman. In one of the literary and fashionable circles of Berlin he had met a young lady, a Fräulein von Dönniges, for whom he at once felt a passion, which was ardently reciprocated. In the summer of 1864 he met her again on the Rigi, when they resolved to marry. She was a young lady of twenty, decidedly unconventional and original in character, but the daughter of a Bavarian diplomatist then resident at Geneva, who was angry beyond all bounds when he heard of the proposed match, and would have absolutely nothing to do with Lassalle. The lady was imprisoned in her own room, and soon, apparently under the influence of very questionable pressure, renounced Lassalle in favor of another admirer, a Wallachian, Count von Racowitza. Lassalle, who had resorted to every available means to gain his end, was now mad with rage, and sent a challenge both to the lady's father and her betrothed, which was accepted by the latter. At the Carouge, a suburb of Geneva, the meeting took place on the morning of August 28, 1864, when Lassalle was mortally wounded. In spite of such a foolish ending, his funeral was that of a martyr, and by many of his adherents he has been regarded since with feelings almost of religious devotion.

LAS VEGAS, a town of New Mexico, on a branch of the Pecos river, is a growing community with a population (1900) of 3,552. Its chief business is in wool and sheep industry, a large quantity of wool being annually exported. It has railroad, telegraph and bank facilities, and is steadily growing in population and business importance.

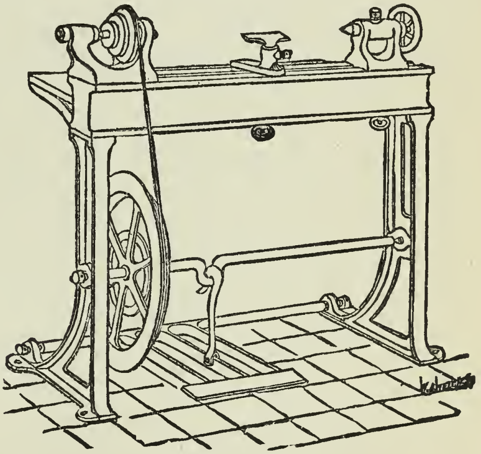
LASSEN, CHRISTIAN, an eminent Orientalist, was born on October 22, 1800, at Bergen in Norway. He died at Bonn on May 8, 1876, having been affected with almost total blindness for many years.

LATAKIA, or LADIKIYEH, a seaport town of Syria, situated opposite the island of Cyprus, about seventy-two miles north of Tripoli, and administratively dependent on the mutassarrif of that city. It is a rather poor-looking place; but, besides being the most important town of a considerable district, the residence of several foreign consuls, and the seat of an American mission, it has considerable historical interest. Remains of the Roman period are still to be seen, the best preserved of which is a sort of triumphal arch hypothetically assigned to the time of Septimius Severus. As a trading port Latakia has recently declined.

LATHE. In its simplest form—a form which is still employed by the natives of India—the lathe consists of two upright posts each carrying a fixed pin or dead center, between which the work in hand is caused to revolve by an assistant pulling alternately the two ends of a cord passed round it. A tool held firmly on a bar which forms a "rest" then attacks in succession the projecting parts, and in this way the entire surface is brought to an equal distance from the central axis; in other words, the cross section becomes everywhere circular.

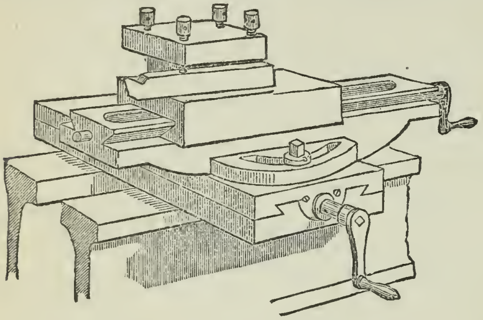
The lathe seems to have but tardily developed into the "foot-lathe," the application to it of a fly-wheel worked by a crank and treadle having been exceptional rather than usual even in the early part of the present century, though a separate fly-wheel turned by an assistant had long previously been employed, and must have rendered possible the turning of heavy work which could not have been attempted without it. The hubs of cartwheels were doubtless a case in point, and for these as well as for many other purposes detached fly-wheels still render good service where steam or other motive power is not available.

The types of modern lathes are as various as are the occupations of those who use them. The mechanic, the soft-wood turner, and the amateur, for instance, differ so greatly in their requirements that a lathe which would be well suited to the one would be very ill adapted, even if not wholly useless, to the other. Thus the professional turner of soft wood, with a lathe of which the frame and even the fly-wheel are of timber (its value in dimes being not very different from the price of an amateur's lathe in dollars) will use a high rate of speed and sharp tools and light cuts, and so obtain results with which the owner of an elaborate instrument cannot at all compete. A modern mechanic's lathe, on the other hand, has very different demands made upon it. For this the greatest possible steadiness in all the working parts is the main desideratum, and it is of great advantage to have the means of obtaining a slow speed, so as to be able to take the heaviest cuts which its strength and the power available warrant. Timber has accordingly given place either to cast-iron or gun-metal or steel in almost every part of a lathe of this class, the resulting increase of weight and firmness enabling the hand turner successfully to operate on small sizes of wrought iron or even steel, notwithstanding that in driving the fly-wheel his force can be applied only during a portion of each revolution.



FOOT LATHE.

In turning hard materials such as these it is of primary importance that the tool should be held more rigidly than it can with the hand when no support is available, except that of a narrow T-headed rest. The difficulty of doing this was, to some extent, got over formerly by employing "heel tools," which transferred most of the strain directly to a flat-topped rest, and made correspondingly reduced demands upon the arm of the turner; but it was never completely overcome till the introduction of the "slide rest" placed the movement of the tool under complete control, and grasped it in a hand that never tires. Fig. 2 shows a slide-rest such as would be used with the lathe in the previous engraving, for which purpose simplicity of construction and steadiness in all its parts are the points chiefly aimed at. Slide-rests designed for amateurs' use are sometimes very different from this in respect of complication, and the number of different movements of which they are capable, but each increase in the number of parts intervening between the lathe-bed and the tool is a source of possible unsteadiness, which should not be introduced without reason.



Foremost among the more complicated lathes, both in utility and in the date of their introduction, stand "screw-cutting lathes," in which a regular spiral can be traced upon the work by self-acting means. The traversing mandrel, in which this end was formerly attained by giving a longitudinal motion to the mandrel and the work attached to it, and keeping the tool stationary, is now but little used, the modern plan of causing the slide-rest to travel along the bed automatically being more convenient in most instances. It involves, however, an amount of gearing almost inadmissible in a foot-lathe, and it is for those driven by steam-power that it is chiefly employed.

"Chucks"—a term which embraces most of the contrivances by which the turner establishes connection between his work and the mandrel—have been made to contribute in various ways to the production of abnormal forms. The oval chuck is used (as its name implies) for giving an elliptical path to the work in lieu of a circular one. The eccentric chuck enables any point or any series of points in succession to be brought into a line with the axis of the mandrel. With the former chuck, therefore, a fixed tool can trace an ellipse on the face of the work, and with the latter a series of intersecting or adjacent circles can be described by it. In this way a great variety of intricate "engine-turned" patterns can be produced by the lathe. To the complicated apparatus known as the geometric chuck, neither straight lines nor irregular curves are impossible. The "rose-engine" is a very old device for producing a somewhat similar kind of ornament, by giving a chattering motion to the mandrel, which is specially mounted on a vibrating frame for that purpose. The wavy lines on the backs of watches are engraved in this way, the curvature of the case not preventing the use of the rose-engine, as it would that of the eccentric chuck. But it is probable that these methods of producing face-work ornament will gradually disappear, and that all who still have leisure for doing them will prefer to use elliptic and eccentric and rose cutters fixed in the slide-rest and driven independently of the mandrel by overhead motion. With these similar results can be obtained, and the tool only instead of the entire mass of the work has to follow the desired curve.

LATIMER, Hugh, bishop of Worcester, and one of the chief promoters of the Reformation in England, was a native of Thurcaston, Leicestershire, and the son of a yeoman, who rented a farm "of three or four pounds by year at the uttermost." The year of Latimer's birth is not definitely known. He graduated B.A. in 1510, and M.A. in 1514. Before the latter date he had taken holy orders. Soon his discourses exercised a potent influence on learned and unlearned alike; and, although he restricted himself, as, indeed, was principally his custom through life, to the inculcation of practical righteousness and the censure of clamant abuses, a rumor of his heretical tendencies reached the bishop of Ely, who resolved to become unexpectedly one of his audience. Latimer on seeing him enter the church boldly changed his theme to a portrayal of Christ as the pattern priest and bishop. The points of comparison were, of course, deeply distasteful to the prelate, who, though he professed his "obligations for the good admonition he had received," informed the preacher that he "smelt somewhat of the pan." Latimer was prohibited from preaching in the university or in any pulpits of the diocese, and on his occupying the pulpit of the Augustinian monastery, which enjoyed immunity from episcopal control, he was summoned to answer for his opinions before Wolsey, who, however, was so sensible of the value of such discourses that he gave him special license to preach throughout England. At this time Protestant opinions were being disseminated in England chiefly by the surreptitious circulation of the works of Wycliffe, and especially of his translation of the New Testament. The new leaven had begun to communicate its subtle influence to the universities, but was working chiefly in secret, and even to a great extent unconsciously to those affected by it, for many were in profound ignorance of the ultimate tendency of their own opinions. It was perhaps, as regards England, the most critical conjuncture in the history of the Reformation, both on this account and on account of the position in which Henry VIII. then stood related to it. In no small degree its ultimate fate seemed also to be placed in the hands of Latimer. In 1526 the imprudent zeal of Barnes had resulted in an ignominious recantation, and in 1527 Bilney, Latimer's most trusted coadjutor, incurred the displeasure of Wolsey, and did humiliating penance for his offenses. Latimer, however, besides possessing far-seeing sagacity, quick insight into character, and a ready and formidable wit which thoroughly disconcerted and confused his opponents, had naturally a distaste for mere theological discussion, and the truths he was in the habit of inculcating could scarcely be controverted, although, as he stated them, they were diametrically contradictory of prevailing errors both in doctrine and practice. In December, 1529, he preached his two "Sermons on the Cards," which awakened a turbulent controversy in the university, and his opponents, finding that they were unable to cope with the dexterity and keenness of his satire, would undoubtedly have succeeded in getting him silenced by force, had it not been reported to the king that Latimer "favored his cause," that is, the cause of the divorce. While, therefore, both parties were imperatively commanded to refrain from further dispute, Latimer was invited to preach before Henry in the Lent of 1530. The king was so pleased with the sermon that after it "he did most familiarly talk with him in a gallery." Of the special regard which Henry seemed to have conceived for him Latimer took advantage to pen the famous letter on the free circulation of the Scriptures, an address remarkable, not only for what Mr. Froude justly calls "its almost unexampled grandeur," but for its striking repudiation of the aid of temporal weapons to defend the faith; "for God," he says, "will not have it defended by man or man's power, but by his word only, by which he hath evermore defended it, and that by a way far above man's power and reason." Though the appeal was without effect on the immediate policy of Henry, he could not have been displeased with its tone, for shortly afterward he appointed Latimer one of the royal chaplains. In times so "out of joint" Latimer soon became "weary of the court," and it was with a sense of relief that he accepted the living of West Kington, Wiltshire, conferred on him by the king in 1531. Harassed by severe bodily ailments, encompassed by a raging tumult of religious conflict and persecution, and aware that the faint hopes of better times, which seemed to gild the horizon of the future, might be utterly darkened by a failure either in the constancy of his courage or in his discernment and discretion, he exerted his eloquence with unabating energy in the furtherance of the cause he had at heart. At last a sermon he was persuaded to preach in London exasperated Stokesley, bishop of the diocese, and seemed to furnish that fervent persecutor with an opportunity to overthrow the most dangerous champion of the new opinions. Bilney, of whom Latimer wrote, "if such as he shall die evil, what shall become of me?" perished at the stake in the autumn of 1531, and in January following Latimer was summoned to answer before the bishops in the consistory. After a tedious and captious examination, he was in March brought before a convocation, and on refusing to subscribe certain articles was excommunicated and imprisoned; but through the interference of the king he was finally released after he had voluntarily signified his acceptance of all the articles except two, and confessed that he had erred not only "in discretion but in doctrine." If in this confession he to some extent tampered with his conscience, there is every reason to believe that his culpable timidity was occasioned, not by personal fear, but by anxiety lest by his death he should hinder instead of promoting the cause of truth. After the consecration of Cranmer in 1533 his position was completely altered. A commission appointed to inquire into the disturbances caused by his preaching in Bristol severely censured the conduct of his opponents; and when the bishop prohibited him from preaching in his diocese, he obtained from Cranmer a special license to preach throughout the province of Canterbury. In 1534 Henry formally repudiated the authority of the pope, and from this time Latimer was the chief cooperator with Cranmer and Cromwell in advising the king regarding the series of legislative measures which rendered that repudiation complete and irrevocable.

It was, however, the preaching of Latimer more than the edicts of Henry that established the principles of the Reformation in the minds and hearts of the people; and from his preaching the movement received its chief color and complexion.

In September, 1535, Latimer was consecrated bishop of Worcester. While holding this office he was selected to officiate as preacher when the friar Forest, whom he vainly endeavored to move to submission, was burned at the stake for teaching treason to his penitents. In 1539, being opposed to the "Act of the Six Articles," Latimer resigned his bishopric, learning from Cromwell that this was the wish of the king. It would appear that on this point he was deceived, but as he now declined to accept the articles he was confined within the precincts of the palace of the bishop of Chichester. After the attainder of Cromwell little is known of him unil 1546, when, on account of his connection with the preacher Crome, he was summoned before the council at Greenwich, and committed to the Tower. Henry died before his final trial could take place, and the general pardon at the accession of Edward VI. procured him his liberty. He declined to resume his see, notwithstanding the special request of the Commons, but in January, 1548, again began to preach, and with more effectiveness than ever, crowds thronging to listen to him both in London and in the country. Shortly after the accession of Mary in 1553 a summons was sent to Latimer to appear before the council at Westminster. Though he might have escaped by flight, and though he knew, as he quaintly remarked, that "Smithfield already groaned for him," he at once joyfully obeyed. The pursuivant, he said, was "a welcome messenger." The hardships of his imprisonment, and the long disputations at Oxford, told severely on his health, but he endured all with unbroken cheerfulness. On October 16, 1555, he and Ridley were led to the stake at Oxford. Never was man more free than Latimer from the taint of fanaticism or less dominated by "vain-glory," but the motives which now inspired his courage not only placed him beyond the influence of fear, but enabled him to taste in dying an ineffable thrill of victorious achievement. Ridley he greeted with the words, "Be of good comfort, Master Ridley, and play the man; we shall this day light such a candle by God's grace in England as (I trust) shall never be put out." He "received the flame as it were embracing it. After he had stroked his face with his hands, and (as it were) bathed them a little in the fire, he soon died (as it appeared) with very little pain, or none."

LATIN LANGUAGE. The Latin language first appears in history as the language spoken in the plain of LATIUM, (*q.v.*) In the third century B.C., at which date it first becomes known to us from extant inscriptions and contemporary history, its range as a vernacular was still limited to this district, although the arms of Rome had carried some knowledge of it to the utmost boundaries of the peninsula of Italy. Of the dialects commonly spoken outside the limits of Latium, two appear to have been entirely distinct in character from the rest. In the extreme southeast, inscriptions have been found in considerable numbers, written in a language known as Iapygian or Messapian; but no progress has as yet been made in their interpretation, and it is quite impossible to determine with certainty even to what stock the language may have belonged. There are indications which seem to point in the direction of some kinship with the Albanian, but these are far too slight and untrustworthy to be accepted with any confidence. In Etruria, and at one time in Campania and in the plain of the Po, a language was spoken the affinities of which have not yet been determined satisfactorily.

The other dialects of the Italian peninsula may be divided into two main groups, the Umbro-Sabellian and the Latin. The former is the more extensive in range in the earlier historic times, and includes Umbrian and Oscan or Samnite, still known to us by inscriptions, and (according to tradition) the language of the Sabines, the Marsians, and the Volscians, of which but scanty traces remain. The latter probably had in prehistoric times a much wider range than that to which we find it afterward confined. There are no facts to contradict the hypothesis, to which a consideration of the geographical relations of the several tribes seems to point, that, at one time, not only Latium, but also Campania, Lucania, Italia proper, and the eastern half of Sicily, were inhabited by tribes belonging to the Latin race. But these regions were early subjected to Hellenizing influences, or conquered by Sabellian invaders, and the only dialect closely akin to the Latin of which any specimens are preserved in inscriptions is that of Falerii, in southern Etruria.

The Umbro-Sabellian and the Latin share many characteristics which enable us to unite them as members of a common Italian group; but what is the exact position to be assigned to this group in the Indo-European stock is a question which cannot be regarded as finally determined. Some scholars of eminence, as Schleicher, maintain that its closest affinities are with the Celtic group, mainly on the strength of the agreement of both in the loss of aspirates and retention of spirants, in the form adopted for the expression of the middle or reflexive voice in verbs, and in the dative plural, and on other less significant points. But the more common opinion is that its connection is closest with the Hellenic group, and that we may safely assume the existence of a common Italo-Hellenic nationality.

Three clearly marked stages present themselves in the history of the Latin language—(1) the archaic stage, previous to the development of literature; (2) the stage of literary culture, during which the popular spoken language runs, as it were, underground, giving but few traces of its existence; (3) the stage at which the popular language reappears as coloring literature, and finally, recasting it in its own mold.

The archaic stage is known to us almost wholly from inscriptions, and from isolated forms and words quoted by the grammarians; although a careful study of the phenomena of the diction and especially the meter of the early Roman dramatists reveals to us many of its characteristic tendencies. It may be said to have lasted until the time of Ennius, (d. 169 B.C.)

Perhaps the oldest specimen of the Latin language preserved to us is to be found in two fragments of the Carmina Saliaria preserved by Varro, and one in Terentianus Scaurus, but unfortunately they are so corrupt as to be quite unintelligible without the help of very extensive conjectural changes in the reading. More valuable evidence is supplied in the *Carman Fratrum Arvalium*, which was found in 1778 engraved on one of the numerous tablets recording the transactions of the college of the Arval brothers, dug up on the site of their grove by the Tiber, five miles from the city of Rome; but this also supplies many points for discussion, and even its general meaning is by no means clear.

It is unfortunately impossible to trace the growth of Latin prose diction through its several stages with the same clearness as in the case of poetry. The fragments of the earlier Latin prose writers are too scanty for us to be able to say with certainty when and how a formed prose style was created. But the impulse to it was undoubtedly given in the habitual practice of oratory. The earliest orators, like Cato, were distinguished for strong common sense, biting wit, and vigorous language, rather than for any graces of style; and probably personal *auctoritas* was of far more account than rhetoric both in the law courts and in the assemblies of the people. The first public speaker, according to Cicero, who aimed at a polished style and elaborate periods, was M. Æmelius Lepidus Porcina, in the middle of the second century B.C. On his model the Gracchi and Carbo fashioned themselves, and, if we may judge from the fragments of the orations of C. Gracchus which are preserved, there were few traces of archaism remaining. A more perfect example of the *urbanitas* at which good speakers aimed was supplied by a famous speech of C. Fannius against C. Gracchus, which Cicero considered the best of all orations of the time.

In the earliest continuous prose work which remains to us, the four books *De Rhetorica ad Herennium*, we find the language already almost indistinguishable from that of Cicero. Hence we see that by the time of Cicero Latin prose was fully developed. We may, therefore, pause here to notice the characteristic qualities of the language at its most perfect stage. The Latin critics were themselves fully conscious of the broad distinction in character between their own language and the Greek. Seneca dwells upon the stately and dignified movement of the Latin period, and uses for Cicero the happy epithet of *gradarius*. He allows to the Greeks *gratia*, but claims *potentia* for his own countrymen. Quintilian concedes to Greek more euphony and variety both of vocalization and of accent; he admits that Latin words are harsher in sound, and often less happily adapted to the expression of varying shades of meaning. But he, too, claims "power" as the distinguishing mark of his own language. Feeble thought may be carried off by the exquisite harmony and subtleness of Greek diction; his countrymen must aim at fullness and weight of ideas if they are not to be beaten off the field. The Greek authors are like lightly moving skiffs; the Romans spread wider sails and are wafted by stronger breezes; hence the deeper waters suit them. It is not that the Latin language fails to respond to the calls that are made upon it. Lucretius and Cicero concur, it is true, in complaints of the poverty of their native language; but this was only because they had had no predecessors in the task of adapting it to philosophic utterance; and the long life of Latin technical terms like *qualitas*, *species*, *genus*, *ratio*, shows how well the need was met when it arose.

The greater number of long syllables, combined with the paucity of diphthongs and the consequent monotony of vocalization, and the uniformity of the accent, lent a weight and dignity of movement to the language which well suited the national *gravitas*. The precision of grammatical rules and the entire absence of dialectic forms from the written literature contributed to maintain the character of unity which marked the Roman republic as compared with the multiplicity of Greek states. It was remarked by Bacon that artistic and imaginative nations indulge freely in verbal compounds, practical nations in simple concrete terms. In this respect, too, Latin contrasts with Greek. The attempts made by some of the earlier poets to indulge in novel compounds was felt to be out of harmony with the genius of the language. Composition, though necessarily employed, was kept within narrow limits, and the words thus produced have a sharply defined meaning, wholly unlike the poetical vagueness of some of the Greek compounds. The vocabulary of the language, though receiving accessions from time to time in accordance with practical needs, was rarely enriched by the products of a spontaneous creativeness. In literature the taste of the educated town circles gave the law; and these, trained in the study of the Greek masters of style, required something which should reproduce for them the harmony of the Greek period. Happily the orators who gave form to the Latin prose were able to meet the demand without departing from the spirit of their own language, and the periods of Cicero and Livy, though very different in structure from those of Plato and Demosthenes, are not less satisfying to the ear, or less adequate to the full expression of thought. To Cicero especially the Romans owed the realization of what was possible to their language in the way of artistic finish of style. He represents a protest at one and the same time against the inroads of the *plebeius sermo*, vulgarized by the constant influx of non-Italian provincials into Rome, and the "jargon of spurious and partial culture" in vogue among the Roman pupils of the Asiatic rhetoricians. His essential service was to have caught the tone and style of the true Roman *urbanitas*, and to have fixed it in extensive and widely read speeches and treatises as the final model of classical prose. The influence of Cæsar was wholly in the same direction. His cardinal principle was that every new-fangled and affected expression, from whatever quarter it might come, should be avoided by the writer, as rocks by the mariner. His own style for straightforward simplicity and purity has never been surpassed; and it is not without full reason that Cicero and Cæsar are regarded as the models of classical prose. But, while they fixed the type of the best Latin, they did not and could not alter its essential character. In subtlety, in suggestiveness, in many-sided grace and versatility, it remained far inferior to the Greek. But for dignity and force, for cadence and rhythm, for clearness and precision, the best Latin prose remains unrivaled. These qualities make it preëminently the language of legislation and of commerce. There is no haziness about a Latin sentence; directness, concreteness, and lucidity stamp it as the utterance of men who knew precisely what they wished to say, and said it with all the force at their command.

The poets of the Augustan age mark the opening of a new chapter in the history of the Latin language. The influence of Horace was comparatively slight; he worked in a field of his own, and, although Statius imitated his lyrics, and Persius and Juvenal, especially the former, his satires, on the whole there are few traces of any deep marks left by him on the language of later writers. In his *Satires* and *Epistles* the diction is that of the contemporary *urbanitas*, differing hardly at all from that of Cicero in his epistles and dialogues. Greek words are used sparingly, not with the license which he censures in Lucilius, and in his hexameters are inflected according to Latin rules. In the *Odes*, on the other hand, the language is much more precisely limited. There are practically no archaisms, or plebeian expressions; Greek inflections are employed, but not with the license of Catullus; Greek constructions are fairly numerous, where prose would have employed other constructions, which, though not limited to Horace, is more common with him than with other poets.

In Virgil the development of the Latin language reached its full maturity. What Cicero was to the period, Virgil was to the hexameter; indeed the changes that he wrought were still more marked, inasmuch as the language of verse admits of greater subtlety and finish than even the most artistic prose. For the straightforward idiomatic simplicity of Lucretius and Catullus he substituted a most exact and felicitous choice of diction, rich with the suggestion of the most varied sources of inspiration. Sometimes it is a phrase of Homer's "conveyed" literally with happy boldness, sometimes it is a line of Ennius, or again some artistic Sophoclean combination. Virgil was equally familiar with the great Greek models of style and with the earlier Latin poets. This learning, guided by an unerring sense of fitness and harmony, enabled him to give to his diction a music which recalls at once the fullest tones of the Greek lyre and the lofty strains of the most genuinely national song. His love of antiquarianism in language has often been noticed, but it never passes into pedantry. His vocabulary and constructions are often such as would have conveyed to his contemporaries a grateful flavor of the past, but they would never have been unintelligible.

In Livy's singularly varied and beautiful style we have Latin prose in that rich maturity which seems to portend and almost to necessitate an early decline. To a training in the rhetorical schools, and perhaps professional experience as a teacher of rhetoric, he added a thorough familiarity with contemporary poetry and with the Greek language; and these attainments have all deeply colored his language. It is probable that the variety of style naturally suggested by the wide range of his subject-matter was increased by a half-unconscious adoption of the phrases and constructions of the different authorities whom he had followed in different parts of his work; and the industry of German critics has gone far to demonstrate a conclusion likely enough in itself. In the arrangement of words Livy is much more free than any previous prose writer, aiming, like the poets, at the most effective order rather than at that which is logically suggested. His periods are constructed with less regularity than those of Cicero, and gain at least as much in variety and energy as they lose in uniformity of rhythm and artistic finish.

The brief and few poems of Tibullus supply only what is given much more fully in the words of Ovid. In these we have the language recognized as that best fitted for poetry by the fashionable circles in the later years of Augustus. The style of Ovid bears many traces of the imitation of Virgil, but it is not less deeply affected by the rhetoric of the schools. His never-failing fertility of fancy and command of diction often led him into a diffuseness which mars the effect of his best works; according to Quintilian it was only in his (lost) tragedy of *Medea* that he showed what real excellence he might have reached if he had chosen to control his natural powers rather than to give them full rein.

While the leading writers of the Ciceronian and Augustan eras enable us to trace the gradual development of the Latin language to its utmost finish as an instrument of literary expression, there are some less important authors who supply valuable evidence of the character of the *sermo plebeius*. Among them may be placed the authors of the *Bellum Africanum* and the *Bellum Hispaniense* appended to Cæsar's commentaries. These are not only far inferior to the exquisite *urbanitas* of Cæsar's own writings; they are much rougher in style even than the less polished *Bellum Alexandrinum* and *De Bello Gallico, Liber VIII.*, which are now with justice ascribed to Hirtius. There is sufficient difference between the two to justify us in assuming two different authors; but both freely employ words and constructions which are at once antiquated and vulgar.

In the dark days of Tiberius and the two succeeding emperors, a paralysis seemed to have come upon prose and poetry alike. With the one exception of oratory, literature had long been the utterance of a narrow circle, not the expression of the energies of national life; and now, while all free speech in the popular assemblies was silenced, the nobles were living under a suspicious despotism, which, whatever the advantage which it brought to the poorer classes and to the provincials, was to them a reign of terror. It is no wonder that the fifty years after the accession of Tiberius are a blank as regards all higher literature.

In the writers of Nero's age there are already plain indications of the evil effects of the rhetorical schools upon language as well as literature. The leading man of letters was undoubtedly Seneca the younger, "the Ovid of prose;" and his style set the model which it became the fashion to imitate. But, striking and popular as it was, it could not commend itself to the judgment of sound critics like Quintilian, who held firmly to the great masters of an earlier time. He admits its brilliance, and the fertility of its pointed reflections, but charges the author justly with want of self-restraint, jerkiness, frequent repetitions, and tawdry tricks of rhetoric. He was the worst of models, and pleased by his very faults. In Persius there is a constant straining after rhetorical effect, which fills his verses with harsh and obscure expressions. In his contemporary Lucan we have another example of the faults of a style especially attractive to the young, handled by a youth of brilliant but ill-disciplined powers.

In the elder Pliny the same tendencies are seen occasionally breaking out in the midst of the prosaic and inartistic form in which he gives out the stores of his cumbrous erudition. Quintilian is of interest especially for the sound judgment which led him to a true appreciation of the writers of Rome's golden age. He set himself strenuously to resist the tawdry rhetoric fashionable in his own time, and to hold up before his pupils purer and loftier models. His own criticisms are marked by excellent taste, and often by great happiness of expression, which is pointed without being unduly epigrammatic. But his own style did not escape, as indeed it hardly could, the influences of his time; and in many small points his language falls short of classical purity. There is more approach to the simplicity of the best models in Frontinus, who furnishes a striking proof that it was rather the corruption of literary taste than any serious change in the language of ordinary cultivated men to which the prevalent style was due. Writing on practical matters—the art of war, and the water-supply of Rome—he goes straight to the point without rhetorical flourishes; and the ornaments of style which he occasionally introduces serve to embellish but not to distort his thought.

The epic poets of the Flavian age present a striking contrast to the writers of the Claudian period. As a strained originality was the cardinal fault of the one school, so a tame and slavish following of authority is the mark of the other. The general *correctness* of this period may perhaps be ascribed partly to the political conditions, partly to the establishment of professional schools. Teachers like Quintilian must have done much to repress extravagance of thought and language; but they could not kindle the spark of genius. Valerius Flaccus, Silius Italicus, and Papinius Statius are all correct in diction and in rhythm, and abound in learning: but their inspiration is drawn from books and not from nature or the heart; details are elaborated to the injury of the impression of the whole; every line is labored, and overcharged with epigrammatic rhetoric. Statius shows by far the greatest natural ability and freshness; but he attempts to fill a broad canvas with drawing and coloring suited only to a miniaiure. Juvenal exemplifies the tendencies of the language of his time, as molded by a singularly powerful mind. A careful study of the earlier poets, especially Virgil and Lucan, has kept his language up to a high standard of purity. His style is eminently rhetorical; but it is rhetoric of real power. The concise brevity by which it is marked seems to have been the result of a deliberate attempt to mold his natural diffuseness into the form recognized as most appropriate for satire. In Martial the tendency of this period to witty epigram finds its most perfect embodiment, combined with finished versification. The typical prose writers of this time are Pliny the younger and Tacitus. A study of their diction and syntax will best disclose the characteristics of the silver Latinity. Some of the features of the style of Tacitus are peculiar to himself; but on the whole the following statement represents the tendencies shared in greater or less degree by all the writers of this period. The gains lie mainly in the direction of a more varied and occasionally more effective syntax; its most striking defect is a lack of harmony in the periods, of arrangement in words, of variety in particles arising from the loose connection of sentences. The vocabulary is extended, but there are losses as well as gains.

In his compressed brevity Tacitus may be said to be individual; but in the poetical coloring of his diction, in the rhetorical cast of his sentences, and in his love for picturesqueness and variety he is a true representative of his time.

The language of Suetonius is of interest as giving a specimen of silver Latinity almost entirely free from personal idiosyncrasies; his expressions are regular and straightforward, clear and business-like, and, while in grammar he does not attain to classical purity, he is comparativly free from rhetorical affectations.

A new era commences with the accession of Hadrian, (117 A.D.) As the preceding half century had been marked by the influence of Spanish Latinity (the Senecas, Lucan, Martial, Quintilian), so in this the African style was paramount. This is the period of affected archaisms and pedantic learning, combined at times with a reckless love of innovation and experiment, resulting in the creation of a large number of new formations and in the adoption of much of the plebeian dialect. Fronto and Appuleius mark a strong reaction against the culture of the preceding century, and for evil far more than for good the chain of literary tradition was broken. The language, which had been unduly refined and elaborated, now relapsed into a tasteless and confused patchwork, without either harmony or brilliance of coloring.

The style of the eminent lawyers of this period, foremost among whom is Gaius, deserves especial notice as showing well one of the characteristic excellences of the Latin language. It is for the most part dry and unadorned, and in syntax departs occasionally from classical usages, but it is clear, terse, and exact. Technical terms may cause difficulty to the ordinary reader, but their meaning is always precisely defined; new compounds are employed whenever the subject requires them, but the capacities of the language rise to the demands made upon it; and the conceptions of jurisprudence have never been more adequately expressed than by the great Roman jurists.

In derivation the Romance languages are especially rich, the loss of numerous simple Latin words, which either were too short to bear the abbreviating effects of time, or would have assumed an inconvenient form under the influence of the necessary phonetic changes, being compensated by new creations. Thus in the place of *res*, *vis*, *ius*, *os*, *rus*, *sus*, *crus*, *mus*, we find derivatives from *causa*, *fortia*, *directum*, *bucca*, *campania*, *troia*, *gamba*, *sorex;* and diminutives very frequently replace their primitives. We may notice finally how frequently it was necessary to adopt new forms in order to avoid homonyms; thus *bellum* was driven out by *bellus*, *aequus* by *equus*, *puer* by *purus*, *sol* by *solum*. Frequently words of non-Latin origin were employed for this purpose.

But the formation of the Romance languages, and their occasional employment in popular songs and stories, at first hardly affected at all the use of Latin as the language of literature. Its adoption as the means of utterance of the Christian church lent to it, in the days of its most marked decay, a new, though a strangely transformed, life. So appropriated, it became familiar to all who had even the elements of education throughout western Europe; it was universally retained in the services of the church, if not in the discourses with which these services were sometimes, but by no means always, accompanied; all philosophy and theology to which the new and unformed popular idioms could give no expression were necessarily expressed in their terminology; and it remained, as it is at the present day, the official language of the ecclesiastical authorities. In France it is not until the tenth century that we find any considerable remains of the vernacular in the form of charters and other muniments, and literary prose does not begin until the twelfth century, when French versions of the chronicles, originally written in Latin are fairly common. In Italy, as was perhaps natural, the use of Latin for literature was retained still more tenaciously, and the development of the national language in its new form was extremely slow. It was not before the thirteenth century that there was any serious attempt at writing in Italian; the earliest prose work, the *Composizione del Mundo*, dating from the middle of that century, quite in accordance with the spirit of Italian thought at the time, was a scientific treatise. Numerous *novelle* are preserved to us from about the same period; but the use of Italian as an organ of the literary expression was still so little established than Dante found it natural to write, not only his political treatise *De Monarchia*, but also his defense of the vulgar tongue *De Vulgari Eloquio*, in Latin. Even in the sixteenth century sermons addressed to a mixed audience in Italy were frequently delivered in Latin. The fact that so large a proportion of the chronicles of the Middle Ages proceeded from the monasteries serves to explain the continued use of language familiar to the writers alike in their religious exercises and in their theological studies; and in our own English chronicles we have perhaps an unique instance of the history of a nation recorded for centuries in its own vernacular. Further, as the clergy supplied the secretaries and often the ministers of state in every court in western Europe, Latin continued to be the language of diplomacy and public business; and, as all science and learning were confined to them or to their pupils, works appealing to a learned audience were of necessity clothed in the same garb. Of the vast mass of Latin poetry produced in the cloisters of the Middle Ages, perhaps it is enough to say, with a scholar whose studies made him exceptionally familiar with it, "It offers no one exception to the eternal irrepealable law, that no great poet is inspired but in his native language." Even the Latin hymns, some of which have taken their place among the perennial treasures of the church, owe their charm almost wholly to the intensity of their religious emotions, and to the lofty or plaintive music to which they were wedded, and not to any power in wielding the resources of the language, or happy artistic skill. It is perhaps in the *De Imitatione Christi* that ecclesiastical Latin is seen in its most perfect form. The style is of course wholly unlike that of the classical writers; but the Hebraic individualism, which in the Latin fathers often seems to clash inharmoniously with the general tone of the diction, has here proved strong enough to absorb the whole into its own key. Its terse and pregnant vigor, its direct simplicity, its profound thought, and its intense passion of self-devotion give it a place in the history of literature hardly inferior to that which it has always held among works of religious edification. It was one of the happy effects of a universal language that such a book, embodying, as none other did, the whole spirit of mediæval Christianity, should at once be accessible to the whole of Christendom.

During the long period for which Latin continued to be the language of learning and science, we find the writers who used it dividing themselves broadly into two great classes, according as they were accustomed to employ the current language of the cloister and the court, or aimed at a reproduction of the rhythm and diction of classical times. Of course the line cannot be drawn sharply, and all degrees of purity in idiom and syntax are represented, from the barbarous expressions which teem in many of the chroniclers to the purism of the Ciceronians. But it is not hard, as a rule, to determine in the case of any particular writer whether his style is merely derived from the traditional teaching of the schools, or drawn from a fresh study of the great models; and, while it is impossible to trace in detail the fluctuations in the greater or less badness of the former group, it may not be improper to sketch in outline the origin, the development, and it is to be feared that we must add the decline, of the art of using the Latin language with purity and grace. The attempt to return to something like the classical standard may perhaps have originated in the schools of Charles the Great, but it was least unsuccessful where, as in England, Latin was never a living language, and all knowledge of it had to be obtained from regular grammatical instruction. In the ninth and tenth centuries reference is very rarely made to the classical writers; it was only in the eleventh century, under the influence of the schools of Lanfranc and Anselm, that a purer taste and a wider knowledge begin to show themselves. If the impulse came from Italy, the scholars of England and France soon surpassed their masters, and there is probably no Italian scholar who can be placed by the side of John of Salisbury, or (in the next century) of Abelard and Bernard of Clairvaux. But the influence of the mendicant friars, and the corruption of the monastic houses, led to a decline at least as marked as the revival; and the Latin of the thirteenth century was not less barbarous, as a rule, than that of the tenth. A far more enduring movement for reform is connected with the name of Petrarch (1304–1374). According to his own account the sweetness and sonorousness of the periods of Cicero charmed his ears, when a boy, and made all other Latin seem to him harsh and discordant. Of course he was unable to escape altogether the influence of his time, and the more accurate scholars of a later age, aided by the vast improvement in the *subsidia* of learning, such as dictionaries and grammars, find much to censure in his diction. But at least he set the example of that enthusiastic study of the great ancient models which is the only possible road to a finished and harmonious Latin style; and the lesson that he taught was not destined to be forgotten, until it had borne its due fruits. His favorite pupil, John of Ravenna, was himself the teacher of the best scholars of the next generation; and to one of these, Gasparini of Barziza (died 1431), has commonly been assigned the distinction of being the father of the pure and elegant Latinity of the Renaissance. His devotion to the study of Cicero is shown by the plan which he formed to fill up, by conjectural links, the numerous deficiencies in the MSS. of the *De Oratore* then known to scholars, a design happily superseded by the discovery of the famous *Codex Laudianus*. Additional material was furnished by the recovery of not a few authors or portions of authors of the best period by the unwearied diligence of Poggio Bracciolini; and from henceforward the study of the Latin classics was pursued with the happiest results. Throughout the fifteenth century no literary acquirement was more valued than a good Latin style; the patronage extended to scholarship by the learned Pope Nicholas V. and the grammatical teaching of scholars like Laurentius Vaila combined to encourage its pursuit with energy and success. Toward the latter part of the century Politian at Florence and Hermolaus Barbarus at Venice showed a mastery over the Latin language which won for them the enthusiastic admiration of their contemporaries; and, though the learning of these eminent scholars proved not infrequently injurious to their style by inducing an affectation of obsolete or unfamiliar words, there is no reason to deny that on the whole this admiration was well deserved. In Germany they had a worthy rival, by some even ranked before them, in Agricola; in France and England there was as yet no one who, in the judgment afterward expressed by Erasmus, could be said to write Latin at all. As far as purity of style went, the highest pitch of excellence was doubtless reached by the Italians toward the beginning of the sixteenth century. Sadolet, Bembo, Paulus Manutius, and, we must in justice add, Longolins in France, wrote Latin with a grace and finish which place their works in respect of style almost on a level with those of their great model, Cicero. But it cannot be denied that their fastidiousness of language often led them to sacrifice the fruits to the flowers of learning, and justly drew down upon them the witty and biting censures of Erasmus in his *Ciceronianus*. In the controversy between the men of learning and the men of taste, the best tendencies of the age were decidedly on the side of the former; and the Italian scholars whose object, as Hallam well expressed it, was "to write pure Latin, to glean little morsels of Roman literature, to talk a heathenish philosophy in private, and to leave the world to its own abuses," had little influence on the next generation in comparison with the wider culture and loftier aims of scholars like Erasmus and Melanchthon. The rapid extension of a knowledge of Greek literature, especially in England, France, and Germany, had its effects in the same direction. Men threw themselves into the new world of thought thus revealed with an eager avidity which left little leisure for that elaborate polishing of periods which had been the delight of the Ciceronianists. The sixteenth century saw enormous advances in the knowledge of antiquity; but the most learned scholars were by no means always equally famous for their skill in the use of the Latin language. Even in Italy itself the most eminent writers on classical subjects approach rather to the German than to the Ciceronian type, and are more distinguished for the width of their erudition and the abundance of their quotations than for elegance or purity of style. On this side of the Alps the prevalence of the same type was, as might have been expected, all but universal. Muretus alone perhaps maintained in this generation the best traditions of style, and was pronounced, even by the judgment of the censorious Scaliger, to have written better Latin than anyone since Cicero; in Italy, however, he had a formidable rival in the last of the Ciceronians, Paulus Manutius. It shows how little Latin was now a living language that the latter, like all his school, refused to speak in Latin, for fear that the necessities of daily conversation should make him familiar with barbarous phrases, which would hardly fail to taint his written style. Others for a similar reason always recited the breviary in Greek, just as in later days some have refused to read the New Testament in the original language for fear of spoiling the purity of their Attic prose. In Germany especially the influence of Lipsius founded a new school of Latinists, based on the imitation of the silver Latinity of Tacitus and Seneca, and conspicuous for some of the merits, and more than all the faults, which have been noticed above as marking those authors. In Britain the only scholar whose style merits especial notice is George Buchanan, whose prose is hardly less admirable than his famous poetical version of the Psalms. On the whole it must be said that, while the improvement in works of reference, and in methods of education generally (especially through the activity of the Jesuits), raises the average of correctness and purity, there is less grace and power than may be found among the best of the writers of an earlier time. As yet the use of Latin as a means of literary expression and of public business showed no signs of decline, except perhaps in Germany, where the version of the Bible by Luther and his popular works in the vernacular had given a model for literary German, and in England, where some of the great works of controversial theology, notably Hooker's *Ecclesiastical Polity*, were already published in English, doing thereby incalculable service to the dignity and the enrichment of the native tongue. But during the seventeenth century, as a consequence of the steady development of the various national literatures, Latin came to be more and more merely the language of the learned. Some of the most eminent scholars belong to this period; and among them Heinsius, Grotius, Salmasius, and his more illustrious antagonist Milton, are all famous for the elegance of their diction; while Scioppius and Vossius contributed largely to the scientific knowledge of grammar. But toward the end of the century complaints as to the general decay of learning frequently occur. In Germany it was almost extinct. In France the Jesuit colleges maintained the traditions of a pure Latinity with some success, and were noted for the polished though sometimes too rhetorical style in which their exercises were conducted. In England the decay of Latin was never so complete as that of Greek; and the great name of Bentley shines out conspicuous, set off, it must be admitted, by the schoolboy darkness of most of his rivals. Even he did not escape the ferule of the schoolmaster, Richard Johnson of Nottingham, who claims in his *Anti-Aristarchus* to have pointed out more than ninety errors in the great scholar's Latinity. In the eighteenth century we still find Latin used for works on science and philosophy, which appealed to the learned in all countries; to say nothing of Newton's *Principia* (1689), Burnet's *Theoria Telluris Sacra* (1694), and Ray's *Synopsis Methodica* (1693), and subsequent botanical works, we find even Linnæus in 1760 issuing his *Systema Naturae* in Latin. But as an organ of general literature it may be said to have expired in the course of the seventeenth century. The last great philosopher who habitually employed Latin for his works was Leibnitz (1646-1716); perhaps the last important work in English theology written in Latin was Bull's *Defensio Fidei Nicenae* (1685).

The use of Latin in diplomacy died out toward the end of the seventeenth century. The Spanish embassy sent to the court of James I. in 1605 used sometimes Latin and sometimes French; the Latin state-papers written by Milton during the Commonwealth are well known; and in the negotiations at Munster (1644) even the French representative, M. d'Avaux, prided himself on his skill in writing Latin. But at Nymwegen (1677) the Danish ambassador's claim that the Latin language should be used between the French representative and himself was rejected as an impertinence; and he was obliged to agree that, while he might employ Latin himself, the French should use their own language. At Ryswick, Temple opened the proceedings in French; he was answered by the bishop of Gurk in Latin; but the French envoys pleaded that they had forgotten their Latin, and the subsequent proceedings were conducted in French (*cf.* Bernard's *Lectures on Diplomacy*, pp. 153-155). Long after this date the German empire insisted that all negotiations with it should be conducted in Latin; and, although Joseph II. attempted to make German the official language of Hungary in its place, he was compelled to give way, and it was only in 1825 that Latin was for the first time displaced by Magyar in the debates of the diet. It is now the universal practice that written communications from any European power should be made in the language of that power, but oral intercourse is carried on in French, with rare exceptions.

LATIN LITERATURE. See ROME.

LATITUDE. See ASTRONOMY, GEODESY, and GEOGRAPHY (MATHEMATICAL).

LATIUM, in ancient geography, was the name given to the portion of central Italy which adjoined the Tyrrhenian Sea on the west, and was situated between Etruria and Campania. The name was, however, applied in a very different sense at different times, and the extent of country comprised under this appellation varied materially. Latium originally means the land of the Latini, and in this sense, which is that alone in use historically, it was a tract of comparatively limited extent; but after the overthrow of the Latin confederacy, when the neighboring tribes of the Hernicans, Volscians and Auruncans, as well as the Latins properly so called, were reduced to the condition of subjects and citizens of Rome, the name of Latium was extended so as to comprise them all, and include the whole country from the Tiber to the Liris. The change thus introduced was not formally established till the reign of Augustus; but it is already recognized by Strabo, as well as by Pliny, who terms the additional territory thus incorporated Latium Adjectum, while he designates the original Latium, extending from the Tiber to Circeii, as Latium Antiquum.

LATONA is the Latin name of the Greek Leto, mother of Apollo and Artemis. In Greece she belongs rather to the sphere of mythology than of religion; she forms part of the surroundings of these two great deities, but is not usually a goddess to whom worship is paid or temples built. Different forms of the Latona legend are found in the various seats of Apolline religion. Of these seats the chief are Delos and Delphi, and the tradition which has obtained the widest literary currency is a union of the legends of these two places, formed doubtless under the unifying influence of the Delphic oracle. Latona, pregnant by Zeus, long seeks in vain for a place of refuge to be delivered. She wanders from Crete over Athens, the coast of Thrace and Asia Minor, and the islands; at last the barren, desolate isle of Delos offers itself. Pindar and later poets tell that Delos was a wandering rock borne about by the waves, till it was fixed to the bottom of the sea to serve for the birth of Apollo. Hence arose the belief that Delos could not be shaken by earthquakes—a belief that was disproved by several shocks in historical times. In the oldest forms of the legend Hera is not mentioned; but afterward the wanderings of Leto are ascribed to the jealousy of Hera, enraged at her amour with Zeus. In the legend the foundation of Delphi follows immediately on the birth of the god; and on the sacred way between Tempe and Delphi the giant Tityus offers violence to Leto, and is immediately slain by the arrows of Apollo and Artemis.

LATOUR D'AUVERGNE, THEOPHILE MALO CORRET DE, dubbed by Napoleon "First Grenadier of the Armies of the Republic," was born November 23, 1743, at Carhaix in Finistère, of an illegitimate branch of the family of the Dukes of Latour d'Auvergne. He enlisted as a musketeer in 1767, and distinguished himself at the siege of Port Mahon in 1782. But he steadily refused advancement in military rank, and was killed, a simple captain, on June 28, 1800, at Oberhausen, near Neuburg in Bavaria. When he died the whole French army mourned for him three days; his sabre was placed in the church of the Invalides at Paris; and every morning, till the close of the empire, at the muster-roll of his regiment his name continued to be called, and the senior sergeant answered to the call: "*Mort au champ d' honneur*" (Dead on the field of honor).

LATREILLE, PIERRE-ANDRÉ, French naturalist, was born at Brives-la-Gaillarde, now in the department of Corrèze, France, on November 29, 1762. He died in 1833.

LAUBAN, chief town of a circle of the same name in the government of Liegnitz and province of Prussian Silesia, is situated in a picturesque valley, at the junction of the lines of railway from Görlitz and Sorau, thirty-nine miles west-southwest from Liegnitz. Population (1900), about 17,000.

LAUD, WILLIAM, archbishop of Canterbury, was born at Reading on October 7, 1573. In 1590 he became a scholar of St. John's, Oxford, and a fellow in 1593. In 1601 he entered the ministry of the church. In 1605 he married the earl of Devonshire to the divorced Lady Rich, an act which he never ceased to regret. In 1611 he became president of St. John's. His career at Oxford brought him in collision with the authorities of the university. He was one of those who were revolted by the Calvinistic Puritanism which prevailed, and he upheld in a sharp, irritating way the doctrines of the divine right of Episcopacy, and of the permanent existence of the church during the Middle Ages, which was regarded as rank heresy by the Puritans. In 1616 he was appointed to the deanery of Gloucester, and, with the king's approbation, removed the communion table in the cathedral to the east end. In 1621 James made him bishop of St. David's, though, if a commonly received story is to be believed, he entertained grave doubts whether Laud would exercise the episcopal authority with wisdom. In 1622 the new bishop took part in a controversy with Fisher the Jesuit, on the claims of the Papal Church. His argument, which was afterward published, was not only a serious contribution to controversial literature, but marks a distinct advance in the direction which was afterward taken by Chillingworth.

The controversy with Fisher had been entered on in order to save Buckingham's mother from conversion to the Church of Rome. It failed in this object, but it gained for Laud considerable influence over Buckingham himself, and through Buckingham over Prince Charles, who, when he became king in 1625, was attracted to an ecclesiastical adviser whose opinions so closely resembled his own, and whose firmness of character supplied a contrast to the irresoluteness of which he could scarcely be unconscious. During the first years of the reign Laud was frequently consulted in matters relating to the church. He is found favoring the promotion of anti-Puritan divines, approving Montague's *Appello Cæsarem*, and generally throwing his weight into the scale against the assumption of the House of Commons to lay down the law in politics and religion.

In 1628 Laud was made bishop of London, and when the ecclesiastical controversy came to a head in the session of 1629, his biography became identified, till the meeting of the Long Parliament, with the history of the Church of England.

Intellectually Laud's position was that of a man opposed to the dogmatism of the Calvinists. "The wisdom of the Church," he wrote, "hath been in all ages, or the most, to require consent to articles in general as much as may be, because that is the way of unity, and the church in high points requiring assent to particulars hath been rent." Laud's love of peace unhappily led him to shrink from the free exuberance of spiritual life. Perhaps it could hardly be expected, in an age when each ecclesiastical party was longing to persecute all others, that any man placed in authority should think it possible to allow the struggling parties to grow up side by side, in what must have seemed the vain hope that liberty would bring a larger harmony. Laud, at least, had no conception of the kind. He was by nature a lover of order and discipline, devoid of the higher spiritual enthusiasm or breadth of judgment which characterizes the higher order of intellect. He spoke of Aristotle, the philosopher, who lays such stress on the formation of habits, as his great master *in humanis*. All Laud's work in life was to attempt to form habits, to make men learn to be decent by acting decently, and to be religious by acting religiously. "Since I came to this place," he says of himself, "I labored nothing more than that the external public worship of God—too much slighted in most parts of this kingdom—might be preserved, and that with as much decency and uniformity as might be, being still of opinion that unity cannot long continue in the church when uniformity is shut out at the church doors. And I evidently saw that the public neglect of God's service in the outward face of it, and the nasty lying of many places dedicated to that service, had almost cast a damp upon the true and inward worship of God—which, while we live in the body, needs external help, and all little enough to keep it in any vigor."

Upon these principles he acted, more especially after his promotion in 1633 to the archbishopric of Canterbury. His metropolitical visitation of the province enforced his system of uniformity in every parish contained in it. He had no sympathy with the special doctrines of the Papal Church, still less with its ceremonial; but he held that conformity to the prayer-book was to be the universal rule. He gave great offense to the Puritans by insisting upon the removal of the communion table to the east end of the church, while the communicants were to receive the sacrament on their knees. For this and for the enforcement of other observances he was stigmatized as an innovator, but he repelled the charge in the speech which he delivered at the trial in the Star Chamber of Prynne, Bastwick, and Burton in 1637, declaring that the Puritan usages were themselves innovations on the practice inculcated at the Reformation.

Nor did Laud confine himself to imposing ceremonies upon the clergy. The church courts undertook in those days to reform the morals of the laity, and Laud excited much ill-feeling by insisting that the powerful and wealthy should submit to punishment as well as the poor. As a privy councilor he took part in affairs of state, and upon the death of Portland in 1635 he became a commissioner of the treasury till he procured for Bishop Juxon the appointment of lord treasurer in 1637. The advice which he gave to the king with respect to the introduction of a new prayer-book into Scotland proved ultimately fatal to him. Of this prayer-book, in the amendment of which he had had a considerable share, he was not unnaturally regarded as the author; and, when in 1640 the Scots triumphantly occupied the northern counties, and sent commissioners to London to negotiate a peace, they called for the punishment of the archbishop as the great incendiary. One of the first acts of the Commons after the meeting of the Long Parliament was to impeach him. For some time he remained in prison, apparently overlooked. But in 1643 there was fresh need of conciliating the Scots, and his impeachment was proceeded with. He made an able and in many respects a satisfactory defense, but his condemnation was a foregone conclusion, and he was executed on January 10, 1644, at the age of seventy-two

LAUDANUM. See Opium.

LAUDER, Sir Thomas Dick, Bart., miscellaneous writer, was born at Edinburgh in 1784. He died on May 29, 1848.

LAUENBURG, formerly a duchy belonging with Holstein to Denmark, but from 1865 to Prussia, was in July, 1876, incorporated as a circle in the Prussian province of Schleswig-Holstein. The capital is Ratzeburg, and there are two other towns, Mölln and Lauenburg. In 1901 the population was about 60,000, Low Saxons by descent, and with few exceptions Lutherans by confession.

LAUNCESTON, a municipal and parliamentary borough and market-town of England, in the eastern division of the county of Cornwall, is situated on a branch railway line from Plymouth, on an eminence near the Kinsey, an affluent of the Tamar, 213 miles west-southwest from London. Population, 3,217,

LAUNCESTON, the second town of Tasmania, is situated in the north of the island, at the point where the North and South Esk unite to form the River Tamar. It is the northern terminus of the railway from Hobart Town (120 miles distant), and has regular communication by steamer with Melbourne. The population was 18,022 in 1901.

LAUREATE. See Royal Household.

LAUREL. The common laurel is a native of the woody and subalpine regions of the Caucasus, of the mountains of northern Persia, of northwestern Asia

Minor, and of the Crimea. The leaves of this plant are rather large, broadly lance-shaped, and of a leathery consistence, the margin being somewhat serrated. They are remarkable for their poisonous properties, giving off the odor of bitter almonds when bruised; the vapor thus issuing is sufficient to kill small insects. Cherry laurel water is a solution of the volatile oil. The leaves when cut up finely and distilled yield the oil of bitter almonds and hydrocyanic (prussic) acid. Sweetmeats, custard, cream, etc., are often flavored with laurel-leaf water, as it imparts the same flavor as bitter almonds; but it should be used sparingly, as it is a dangerous poison, having several times proved fatal. The first case occurred in 1731, which induced a careful investigation to be made of its nature, which was discovered by Schrader in 1802 to be hydrocyanic acid. The effects of the distilled laurel-leaf water on living vegetables is to destroy them like ordinary prussic acid; while a few drops act on animals as a powerful poison. It was introduced into the British pharmacopœia in 1839, but is more generally superseded by the use of hydrocyanic acid. The following varieties of the common laurel are in cultivation:—The Caucasian (*Prunus Laurocerasus caucasica*), which is hardier and bears very rich, dark-green, glossy foliage; the Versailles laurel (*P. L. latifolia*), which has larger leaves· the Colchican (*P. L. colchica*), which is a dwarf-spreading bush with narrow, sharply serrated, pale green leaves. There is also the variety *rotundifolia* with short, broad leaves, the Grecian with narrow leaves, and the Alexandrian with very small leaves.

The Portugal laurel is believed to be a native of Portugal and Madeira. This tree, together with a variety called *Hixa*, Ser., which bears larger leaves and has the flowers more closely disposed, were found growing together in 1827 on the Serra de Gerez, in Portugal, the former being twenty feet high while the latter attained to seventy feet.

The evergreen glossy foliage of the common and Portugal laurels renders them well adapted for shrubberies, while the racemes of white flowers are not devoid of beauty.

The bay, or sweet laurel (*Laurus nobilis*, L.), belongs to the family *Lauraceæ*, which contains sassafras, benzoin, camphor, and other trees remarkable for their aromatic properties. It is a large evergreen shrub, sometimes reaching the height of sixty feet, but rarely assuming a truly tree-like character. The leaves are smaller than those of the preceding laurels, possessing an aromatic and slightly bitter flavor, and are quite devoid of the poisonous properties of the cherry laurel. The small yellowish-green flowers are produced in axillary clusters, and consist of a calyx only, which incloses nine stamens in the male, the anthers of which dehisce by valves which lift upward as in the common barberry, and carry glandular processes at the base of the filament. The fruit consists of a succulent berry, surrounded by the persistent base of the calyx. The bay laurel is a native of Italy, Greece, and North Africa. The bay laurel was brought to North America by the early colonists, but, like the others, apparently does not thrive here.

LAURENS, Henry, American statesman, was born at Charleston, S. C., in 1724, of Huguenot ancestry. After receiving a good education, he entered a counting-house in London by way of preparation for commercial pursuits, in which he engaged, after his return to Charleston, with such success as to amass rapidly a large fortune. He accepted ardently the advanced views of individual rights then prevalent in the colony, and was several times engaged in stubborn contests with the crown judges, in which he resisted their alleged arbitrary and oppressive rulings, not only by all legal means at his command, but in occasional pamphlets, the vigor and legal acumen of which attracted much attention. He retired from active business in 1771, and spent the next three years in Europe in travel, and in superintending the education of his sons in England. In 1774 he united with thirty-seven other Americans in a petition to parliament against the passing of the Boston Port Bill, in the hope of averting war. Becoming convinced that a peaceful settlement was impracticable, he returned to Charleston at the close of 1774, to take part with his fellow colonists in the impending struggle. He was soon made president of the South Carolina council of safety, and in 1776 a delegate from that colony to the general continental congress at Philadelphia, of which body he was president during 1777–78. Throughout these years he was a steadfast and influential promoter of the colonial cause, and a trusted friend of Washington. In 1778 he undertook a mission as minister plenipotentiary to Holland, in furtherance of secret negotiations for a commercial treaty which had been some time in progress; but, while on the way, he was captured by a British frigate, and taken to London. On the evidence of his papers, which he had vainly attempted to destroy, war was declared upon Holland by Great Britain, and Laurens was closely imprisoned in the Tower. During his imprisonment of nearly fifteen months, his health became greatly enfeebled, yet he steadily refused opportunities for procuring release by abandoning his patriotic principles. Having been set free late in 1781, he was appointed by congress one of the commissioners for negotiating the peace; and, proceeding to Paris with Franklin and Jay, he signed with them, on November 30, 1782, the preliminaries of the treaty. Failing health obliged him to return to Charleston, S. C., where he passed his remaining years in retirement, much respected and beloved by his countrymen. He died in December, 1792, and, in accordance with the directions of his will, his body was burned, and the bones and ashes were carefully collected and buried.

LAURENS, John, an American revolutionary officer of distinguished bravery, son of Henry Laurens noticed above, was born at Charleston, S. C., in 1756. He was educated in England, and on his return to America in 1777, in the height of the revolutionary struggle, he joined Washington's staff. He soon gained the commander's confidence, which he reciprocated with the most devoted attachment, and was intrusted with the delicate duties of a confidential secretary, which he performed with much tact and skill. He was present in all Washington's battles, from that of the Brandywine to Yorktown, and his gallantry on every occasion has gained him the title of "the Bayard of the Revolution." Laurens displayed bravery even to rashness in the storming of the Chew mansion at Germantown; at Monmouth, where he saved Washington's life by rushing between him and danger, and was himself severely wounded; and at Coosahatchie, where, with a handful of men, he defended a pass against a large English force under General Prevost, and where he was again wounded. In command of a body of light infantry at the storming of Savannah, he was among the first to penetrate the English lines, and again distinguished himself at the siege of Charleston in 1780. After the capture of Charleston by the English, he rejoined Washington, and was selected by him as a special envoy to appeal to the king of France for supplies for the relief of the American armies, which had been brought by prolonged service and scanty pay to the verge of dissolution. The more active coöperation of the French fleets with the land forces in Virginia, which was one result of his mission, brought about the unexpected overwhelming of Cornwallis at Yorktown. Laurens lost no time in rejoining the army, and at Yorktown was at the head of the American storming party which captured the first redoubt, and received the sword of Colonel Campbell, its commander. Laurens was designated with Count de Noailles to arrange the terms of a surrender, which occurred October 19, 1781, and virtually ended the war, although desultory skirmishing, especially in the south, attended the months of delay before peace was formally concluded. In one of these trifling affairs in July, 1782, on the Combahee Ferry, Laurens exposed himself needlessly and was killed.

LAURIA, or LORIA, a city of Italy, in the province of Potenza, thirteen miles south of Lagonegro, consisting of a walled town on the steep side of a hill and another portion in the plain below. The castle was the birthplace of Ruggiero di Loria, the great Italian admiral of the thirteenth century. The population is 15,609.

LAURVIK, or LAURVIG, a seaport town of southeastern Norway, in the amt of Jarlsberg, is situated at the head of a short fjord, near where the Lougen or Laagen Elv falls into the sea.

LAUSANNE, the chief town of the canton of Vaud, in Switzerland, lies about twenty-seven miles northeast of Geneva and one mile to the north of the lake, which used not infrequently to be called the Lake of Lausanne instead of the Lake of Geneva. It is the junction of the railways to Geneva, from Bern and the Rhone valley, and has direct communication with Paris, *via* Pontarlier. A railway worked by a cable connects the town proper with the village and port of Ouchy on the lake. Built on the lower slopes of Mount Jorat, partly on the crests and declivities of three hills and partly in the intervening valleys, Lausanne presents a fine appearance from the water, and in turn enjoys a wide outlook over the Alps of Savoy on the farther side. Modern improvements have largely modified the original characteristics of the site. The academy, founded by the Bernese authorities in 1589, has numbered among its teachers Theodore Beza, Conrad Gessner, De Crousaz, Vinet, and Juste Olivier. Since the days of Gibbon, whose praises of the town have been often repeated, Lausanne has become a favorite place of residence for foreigners, and an international center of education. The population was 26,520 (22,610 Protestants, 3,517 Roman Catholics) in 1870, 30,179 in 1880, and 47,039 in 1901.

LAVA. See GEOLOGY.

LAVAGNA, a market-town of Italy, in the province of Genoa, situated on the seacoast about a mile east of Chiavari, on the railway between Genoa and Pisa.

LAVAL, capital of the department of Mayenne, France, is situated on the Mayenne, 186 miles by railway west from Paris. On the right bank of the river stands the old feudal city, with its ancient castle, and its irregularly built houses whose slate roofs and pointed gables peep from the groves of trees which clothe the hill. The principal industry of the town is the linen manufacture, introduced from Flanders in the fourteenth century. Population, 27,000.

LAVATER, JOHANN KASPAR, was born at Zürich, November 15, 1741. Consistent with himself from the first, he manifested little application to study, but great depth of feeling, especially on religious themes, and a remarkable fluency of fervent and persuasive discourse. When barely one-and-twenty he greatly distinguished himself by denouncing, in conjunction with his friend the painter Fuseli, an iniquitous magistrate, who was compelled to make restitution of his ill-gotten gains. In 1769 Lavater took orders, and officiated till his death as deacon or pastor in various churches in his native city. The advantages of his manner and address, as well as his oratorical fervor and genuine depth of conviction, gave him great personal influence, especially with women; he was extensively consulted as a casuist, and was welcomed with demonstrative enthusiasm in his numerous journeys through Germany. His mystical writings were also widely popular. Scarcely a trace, however, of this influence has remained, and Lavater's name would be forgotten but for his work on physiognomy, *Physiognomische Fragmente zur Beförderung der Menschenkenntniss und Menschenliebe*, Leipsic, 1775–78, republished in French with extensive additions by the author. The fame even of this universally known book rests to a great extent upon the handsome style of publication and the accompanying illustrations. It is not to be compared with the subsequent labors of Caius for scientific value, and leaves the study of physiognomy as desultory and unsystematic as it found it. The author's remarks, nevertheless, frequently display remarkable acuteness and insight into character, and the illustrations render it very valuable to artists. Next to his physiognomy, Lavater is perhaps chiefly remembered for his acquaintance with Goethe, and the lively portrait of him in *Wahrheit und Dichtung*. The impression he produced upon one so dissimilar to himself shows that the man was greater than his works. At a later period Goethe became estranged from him, somewhat abruptly accusing him of superstition and hypocrisy. Of the former charge he cannot be acquitted, seeing that he had manifested a tendency to run after Cagliostro; but he seems to have been no more open to the latter than every man whose ideal of creed and conduct is too exalted to be maintained with unvarying consistency. A more cogent reason for Lavater's discredit with Goethe was his intellectual intolerance. No man was more bigoted upon paper, while in truth his heart was open to all. He was continually propounding the alternative of his own form of Christianity or atheism; and it is indeed true that, if passages in his own writings are to be taken literally, he was himself incapable of conceiving a Deity apart from the person of the Redeemer. Much that he has written might be expressed in the language of Feuerbach with but slight alteration. He had a mystic's indifference to historical Christianity, and, although esteemed by himself and others a champion of orthodoxy, was in fact only an antagonist of rationalism. During the latter years of his life his influence waned, and he incurred ridicule by some exhibitions of vanity, pardonable in the recipient of so much incense. He redeemed himself by his patriotic conduct during the troubles occasioned by the French occupation of Switzerland, which brought about his tragical death. On the taking of Zürich by the French in 1799, Lavater, while endeavoring to appease the soldiery, was shot through the body by an infuriated grenadier, and died after long sufferings, borne with great fortitude, on January 2, 1801.

LAVAUR, chief town of an arrondissement in the department of Tarn, France, twenty-five miles east-northeast of Toulouse, stands at a height of 460 feet on the left bank of the Agout (a tributary of the Tarn), which is here crossed by a bold bridge of a single arch of 160 feet span. The most interesting monument of Lavaur is its cathedral, which dates from the fourteenth and fifteenth centuries. Population, 4,651.

LAVENDER, botanically *Lavandula*, a genus of *Labiatæ*, distinguished by an ovate tubular calyx, a two-lipped corolla, of which the upper lip has two and the lower three lobes, and four stamens bent downward.

The plant to which the name of lavender is commonly applied, *Lavandula vera*, D.C., is a native of the mountainous districts of the countries bordering on the western half of the Mediterranean, extending from the eastern coast of Spain to Calabria and northern Africa, growing in some places at a height of 4,500 feet above the sea-level, and preferring stony declivities in open sunny situations. It is cultivated in the open air as far north as Norway and Livonia. Lavender forms an evergreen undershrub about two feet high, with grayish-green hoary linear leaves, rolled under at the edges when young; the branches are erect, and give a bushy appearance to the plant. The flowers are borne on a terminal spike at the summit of a long naked stalk, the spike being composed of 6–10 verticillasters or dense cymes in the axils of small, brownish, rhomboidal, tapering, opposite bracts, the verticillasters being more widely separated toward the base of the spike. The calyx is tubular, contracted toward the mouth, marked with thirteen ribs and five-toothed, the posterior tooth being the largest. The corolla is of a pale violet color, but darker on its inner surface, tubular, two-lipped, the upper lip with two and the lower with three lobes. Both corolla and calyx are covered with stellate hairs, among which are imbedded shining oil glands to which the fragrance of the plant is due. In England lavender is cultivated chiefly for the distillation of its essential oil, of which it yields on an average of 1½ per cent. when freed from the stalks, but in the south of Europe the flowers form an object of trade, being exported to the Barbary states, Turkey, and America.

In the climate of New York lavender is scarcely hardy, but in the vicinity of Philadelphia considerable quantities are grown for the market, the dried flowers being used for sachets or scent bags and for perfuming linen, etc. In American gardens sweet basil (*Ocimum basilicum*) is frequently called lavender.

LAVOISIER, Antoine Laurent, one of the founders of modern chemistry, was born in Paris, August 26, 1743. His first public distinction was gained on the occasion of a prize offered by the Academy of Sciences for an essay on the best mode of lighting the streets of Paris. To increase the sensitiveness of his eyes, he immured himself for six weeks in a room hung with black, from which all light was excluded except that of the lamps experimented upon. His zeal was a pledge of success, and was rewarded with the gold medal, April 9, 1766. A multitude of subjects now engaged his attention. He presented to the Academy a masterly analysis of gypsum; traveled through France with Guettard, who was occupied in constructing the first geological map of the country, and composed a work, of which a fragment entitled *Mémoire sur les Couches des Montagnes* found a place in the Academy collection for 1789; refuted the prevalent error as to the conversion of water into silica by repeated distillation, and studied the phenomena of thunder and auroræ, of crystallization and congelation. He became an associate of the Academy in 1768, and in 1769 obtained the lucrative post of farmer-general of the revenue, with a view to increase the resources at his command for the advancement of science.

It was about the year 1770 that the vast possibilities of the new field opened to the researches of chemists by the pneumatic discoveries of Black, Cavendish, and Priestley were recognized by Lavoisier, and the perception gave to his genius the definitive impulse hitherto wanting to it. He repeated and verified experiments which became, in his hands, the means of invalidating their author's conclusions, and prepared to import the clear-cut precision of his own ideas into a science as yet illogical in form and incoherent in expression. His wealth and position, as well as his enthusiasm, eminently qualified him to lead a successful reform. He lived in the midst of the most stimulating society of his time. Between him and such men as Laplace, Monge, Berthollet, and Fourcroy the constant interchange of ideas established a community of opinion in physical matters so close that the separate intellectual property of each was all but completely merged in the general stock. On one day in each week Lavoisier threw open his laboratory to a select few of his friends, communicated the results of his labors, and invited their criticism and advice. By this consultative system his work gained in solidity, and lost nothing in originality. On November 1, 1772, Lavoisier, eager to secure the credit of priority, deposited at the Academy a sealed packet containing the record of his earliest conclusions on the crucial point of metallic oxidation. The discovery by Priestley in 1774 of "dephlogisticated air" materially assisted the development of the innovating doctrine, which took the form of a fully fledged theory when Lavoisier in 1778 assigned to the new substance, with the name of "oxygen," the important functions of the universal "acidifying principle." His analysis of water in 1784, and synthesis of "fixed air" (called by him "carbonic acid," *Academy Memoirs*, 1781), opened the way for an extended view of the composition of organic as well as inorganic substances, and the anti-phlogistic chemistry was completed by the publication, in 1787, of the *Méthode de nomenclature chimique*. The reform of language effected by Lavoisier in conjunction with Guyton de Morveau, Berthollet, and Fourcroy was an indispensable prelude to the reform of thought. With the current alchemistic jargon science, properly so-called, could have no fellowship. The new terminology prevailed without change for fifty years, and has been fitted, by trifling modifications, to meet the exigencies of recent progress. The acceptance of the "oxygen theory" was enormously facilitated by the defined and logical form given to it in Lavoisier's *Traité élémentaire de chimie*. Indeed, the history of science scarcely presents a second instance of a change so fundamental accomplished with such ease. The partisans of phlogiston did not, it is true, abandon the field without a struggle. In Berlin they met Lavoisier's demonstrations by burning him in effigy, and in Paris Lamétherie conducted, in the *Journal de Physique*, a fierce polemic against the party of innovation. The controversy was, however, brief, and its issue visibly certain. Before the end of the century the reformed chemistry was everywhere in a position of uncontested triumph.

Appointed director of the powder works by Turgot in 1776, Lavoisier not only suppressed the vexatious searches for saltpeter in the cellars of private houses, but succeeded in quadrupling the produce of the commodity. He, moreover, improved the manufacture of gunpowder so as to add one-third to its explosive force, thereby reversing the previous superiority of English over French ordnance. In 1791 he became commissary to the treasury, where he established a system of accounts of unexampled punctuality. Requested by the National Assembly to set forth a new scheme of taxation, he composed a treatise *De la richesse territoriale de la France*, of which an extract, printed at the public expense, shows him to have been possessed of sound and liberal views on political economy. In short, to quote the words of Lalande, "Lavoisier was to be found everywhere." But those were times when to be conspicuous was to be in peril. On May 2, 1794, Dupin, a member of the Convention, presented a frivolous accusation against the whole of the ex-farmers-general, whose wealth constituted in itself an inexpiable crime. Lavoisier found a hiding-place for a day or two in the deserted apartments of the Academy, but, hearing that his absence was likely to prejudice the cause of his colleagues, he voluntarily gave himself up. He thought it impossible that his life could be taken, but expected the confiscation of his property, when, as he told Lalande, he proposed to earn his bread as an apothecary. Half measures, however, were not in favor with the revolutionary tribunal. On May 6th, he, with twenty-seven others of the same profession, was condemned to the guillotine, and, two days later, the sentence was carried into execution.

LAW. The human race may be conceived as parceled out into a number of distinct groups or societies, differing greatly in size and circumstances, in physical and moral characteristics of all kinds. But they all resemble each other in this that they reveal on examination certain rules of conduct in accordance with which the relations of the members *inter se* are governed. Such rules we may term laws. Each society has its own system of laws, and all the systems, so far as they are known, constitute the appropriate subject-matter of jurisprudence. The jurist may deal with it in the following ways:—He may first of all examine the leading conceptions common to all the systems, or in other words define the leading terms common to them all. Such are the terms *law* itself, *right*, *duty*, *property*, *crime*, and so forth, which, or their equivalents, may, notwithstanding delicate differences of connotation, be regarded as common terms in all systems. That kind of inquiry is what is known as analytical jurisprudence. It regards the conceptions with which it deals as fixed or stationary, and aims at expressing them distinctly and exhibiting their logical relations with each other. What is really meant by a right and by a duty, and what is the true connection between a right and a duty, are types of the questions proper to this inquiry. Shifting our point of view, but still regarding systems of law in the mass, we may consider them, not as stationary, but as changeable and changing, we may ask what general features are exhibited by the record of the change. This, somewhat crudely put, may serve to indicate the field of historical jurisprudence. In its ideal condition it would require an accurate record of the history of all legal systems as its material. As yet the record is exceedingly incomplete, and the results are proportionately limited. But whether the material be abundant or scanty, the method is the same. It seeks the explanation of institutions and legal principles in the facts of history. Its aim is to show how a given rule came to be what it is. The legislative source—the emanation of the rule from a sovereign authority—is of no importance here; what is important is the moral source—the connection of the rule with the ideas prevalent during contemporary periods. This method, it is evident, involves, not only a comparison of successive stages in the history of the same system, but a comparison of different systems, of the Roman with the English, of the Hindu with the Irish, and so on. The historical method as applied to law may be regarded as a special example of the method of comparison. The comparative method is really employed in all generalizations about law; for, although the analysis of legal terms might be conducted with exclusive reference to one system, the advantage of testing the result by reference to other systems is obvious. But, besides the use of comparison for purposes of analysis and in tracing the phenomena of the growth of laws, it is evident that for the purposes of practical legislation the comparison of different systems may yield important results. Laws are contrivances for bringing about certain definite ends, the larger of which are identical in all systems. The comparison of these contrivances not only serves to bring their real object, often obscured as it is in details, into clearer view, but enables legislators to see where the contrivances are deficient, and how they may be improved.

The "science of law," as the expression is generally used, means the examination of laws in general in one or other of the ways just indicated. It means an investigation of laws which exist or have existed in some given society in fact—in other words, positive laws; and it means an examination not limited to the exposition of particular systems. Analytical jurisprudence is in England associated chiefly with the name of JOHN AUSTIN (*q.v.*), whose *Province of Jurisprudence Determined* systematized and completed the work begun in England by Hobbes, and continued at a later date and from a different point of view by Bentham. The best view of the subject will be obtained by taking Austin's principal positions in outline, and considering the criticisms which later jurists have bestowed upon them.

Austin's first position is to distinguish between laws properly so called and laws improperly so called. In any of the older writers on law, we find the various senses in which the word is used grouped together as variations of one common meaning. Thus Blackstone advances to his proper subject, municipal laws, through (1) the laws of inanimate matter, (2) the laws of animal nutrition, digestion, etc., (3) the laws of nature, which are rules imposed by God on men and discoverable by reason alone, and (4) the revealed or Divine law, which is part of the law of nature directly expounded by God. All of these are connected by this common element, that they are "rules of action dictated by some superior being." And some such generalization as this is to be found at the basis of most treatises on jurisprudence which have not been composed under the influence of the analytical school. Austin disposes of it by the distinction that some of those laws are commands, while others are not commands. The so-called laws of nature are not commands; they are uniformities which resemble commands only in so far as they may be supposed to have been ordered by some intelligent being. But they are not commands in the only proper sense of that word—they are not addressed to reasonable beings, who may or may not will obedience to them. Laws of nature are not addressed to anybody, and there is no possible question of obedience or disobedience to them. Austin accordingly pronounces them laws improperly so called and confines his attention to laws properly so called, which are commands addressed by a human superior to a human inferior.

This distinction seems so simple and obvious that the energy, and even bitterness, with which Austin insists upon it now seems superfluous. But the indiscriminate identification of everything to which common speech gives the name of a law was, and still is, a fruitful source of confusion. Blackstone's statement, that when God "put matter into motion, He established certain laws of motion, to which all movable matter must conform," and that in those creatures that have neither the power to think nor to will such laws must be invariably obeyed, so long as the creature itself subsists, for its existence depends on that obedience, imputes to the law of gravitation, in respect of both its origin and its execution, the qualities of an act of parliament. On the other hand, the qualities of the law of gravitation are imputed to certain legal principles which, under the name of the law of nature, are asserted to be binding all over the globe, so that "no human laws are of any validity if contrary to this." Nonsense like this so exasperated Austin that he never fails to stigmatize the use of "natural laws" in the sense of scientific facts as improper, or as metaphorical. A later writer has pointed out that law in the scientific sense has acquired a position of its own, from which it is impossible to dislodge it, and which involves none of the ambiguities and confusions against which Austin protested. It would be as reasonable for the man of science as for the jurist to set up his own conception of law as the only legitimate one. There is, perhaps, only one field of inquiry where the two opposed conceptions of law are still to be found entangled. The "laws of political economy" still hover in the minds of many between the jural and the scientific conception. Certain economical principles appear to have acquired a double character—that of scientific generalization, and that of rules which may be disobeyed. Measures are pronounced to be a violation of the laws of political economy, with a vague implication that these, being laws of nature, any violation of them must be particularly heinous.

Having eliminated metaphorical or figurative laws, we restrict ourselves to those laws which are commands. This word is the key to the analysis of law, and, accordingly, a large portion of Austin's work is occupied with the determination of its meaning. A command is an order issued by a superior to an inferior. It is a signification of desire distinguished by this peculiarity, that "the party to whom it is directed is liable to evil from the other, in case he comply not with the desire." "If you are able and willing to harm me in case I comply not with your wish, the expression of your wish amounts to a command." Being liable to evil in case I comply not with the wish which you signify, I am *bound* or obliged by it, or I lie under a *duty* to obey it. The evil is called a *sanction*, and the command, or duty, is said to be *sanctioned* by the chance of incurring the evil. The three terms, *command*, *duty*, and *sanction*, are thus inseparably connected. As Austin expresses it in the language of formal logic, "each of the three terms signifies the same notion, but each *denotes* a different part of that notion, and *connotes* the residue."

All commands, however, are not laws. That term is reserved for those commands which oblige generally to the performance of acts of a class. A command to your servant to rise at such an hour on such a morning is a particular command, but not a law or rule; a command to rise always at that hour is a law or rule. Of this distinction it is sufficient to say in the meantime that it involves, when we come to deal with positive laws, the rejection of particular enactments to which by inveterate usage the term law would certainly be applied. On the other hand,it is not, according to Austin, necessary that a true law should bind persons as a class. Obligations imposed on the grantee of an office specially created by parliament would imply a law; a general order to go into mourning addressed to the whole nation for a particular occasion would not be a law.

So far we have arrived at a definition of laws properly so called. Austin holds superiority and inferiority to be necessarily implied in command, and such statements as that "laws emanate from superiors" to be the merest tautology and trifling. Elsewhere he sums up the characteristics of true laws as ascertained by the analysis thus: (1) laws, being commands, emanate from a determinate source; (2) every sanction is an evil annexed to a command; and (3) every duty implies a command, and chiefly means obnoxiousness to the evils annexed to commands.

Of true laws, those only are the subject of jurisprudence which are laws strictly so called, or positive laws. Austin accordingly proceeds to distinguish positive from other true laws, which are either laws set by God to men or laws set by men to men, not, however, as political superiors nor in pursuance of a legal right. The discussion of the first of these true but not positive laws leads Austin to his celebrated discussion of the Utilitarian theory. The laws set by God are either revealed or unrevealed, *i.e.*, either expressed in direct command, or made known to men in one or other of the ways denoted by such phrases as the "light of nature," "natural reason," "dictates of nature," and so forth. Austin maintains that the principle of general utility, based ultimately on the assumed benevolence of God, is the true index to such of His commands as He has not chosen to reveal.

The second set of laws properly so called, which are not positive laws, consists of three classes—(1) those which are set by men living in a state of nature; (2) those which are set by sovereigns but not as political superiors, *e.g.*, when one sovereign commands another to act according to a principle of internationl law; and (3) those set by subjects but not in pursuance of legal rights. This group, to which Austin gives the name of positive morality, helps to explain his conception of positive law. Men are living in a state of nature, or a state of anarchy, when they are not living in a state of government or as members of a political society. "Political society" thus becomes the central fact of the theory, and some of the objections that have been urged against it arise from its being applied to conditions of life in which Austin would not have admitted the existence of a political society. Again, the third set in the group is intimately connected with positive laws on the one hand and rules of positive morality which are not even laws properly so called on the other. Thus laws set by subjects in consequence of a legal right are clothed with legal sanctions, and are laws positive. A law set by guardian to ward, in pursuance of a right which the guardian is bound to exercise, is a positive law pure and simple; a law set by master to slave, in pursuance of a legal right which he is not bound to exercise, is, in Austin's phraseology, to be regarded both as a positive moral rule and as a positive law. On the other hand,the rules set by a club or society, and enforced upon its members by exclusion from the society, but not in pursuance of any legal right, are laws, but not positive laws. They are imperative and proceed from a determinate source, but they have no legal or political sanction. Closely connected with this positive morality, consisting of true but not positive laws, is the positive morality whose rules are not laws properly so called at all, though they are generally denominated laws. Such are the laws of honor, the laws of fashion, and, most important of all, international law.

By far the most considerable contribution made by England to historical jurisprudence is the writings of Sir Henry Maine. The first of these (*Ancient Law*), published in 1861, has probably had a more profound influence on contemporary thought than any other book of this generation. *The Early History of Institutions* and *Village Communities in the East and West* have since followed. In *Ancient Law* Sir Henry Maine proposes to trace the connection of the subject with the early history of society and its relation to modern ideas. Taking the Roman law as a typical system, he revealed for the first time to English readers the connection between the principles of forgotten lawyers, and, not merely the legal ideas, but the moral commonplaces of our time. The book undermined what had been accepted as first principles by showing that they had a history. It gratified the intellectual sense by the brilliant identification of legal ideas, obscured by differences of time and place and circumstance. It is not surprising that its influence has been even more extensive among educated laymen than among professional lawyers, for the latter are condemned by custom to disregard everything in their science but its relation to the business of the day. But *Ancient Law* set the attitude of regarding a legal rule not as an isolated fact but as the last link in an historical series. In the better sort of legal textbooks which have recently appeared this attitude is discernible, and on the whole to the advantage of the exposition, even for the purposes of practice.

We have discussed elsewhere, under the headings EQUITY and FICTIONS, two of the modes by which legal changes have been brought about indirectly. Direct lawmaking by the sovereign power, there is reason to believe, is not only everywhere later than these agencies, but its activity is progressive, and constantly tends to displace them. A glance at the English statute-book will show that the legislature at the present day undertakes the deliberate alteration of the law to a much greater extent than it has ever done before. A rough illustration is the fact that the chronological table of the statutes from 1235 to 1877 covers over 300 pages, of which fully two-thirds are occupied with the legislation of the last hundred years. This activity varies, of course, at different times, and the variations, even in recent times, have been remarkable. And, large as are the contributions of modern parliaments to the law, it is notorious that but for defects in the legislative machinery they would be much larger. Nor is this activity to be accounted for by the theory that the domain of law is more intrusive than in earlier times. There has undoubtedly been within the last generation a steady increase in the control asserted by the state over the habits of its citizens, for some account of which reference may be made to the article GOVERNMENT. But on the whole the range of action with which the English law declines to interfere is probably as great now as it ever has been in civilized societies. The true explanation is that parliament has effectually secured for itself exclusive authority as the source of legal changes. The violent assault of Bentham on judiciary law was but the echo of the lesson taught by the English judges as to the omnipotence of parliament, and thoroughly understood and accepted by popular opinion. To that is due the caution, not to say timidity, which now characterizes the judicial interpretation of statutes. The courts adhere to the literal meaning of the enactment unless compelled to open it by its too frequent absurdity or self-contradiction. If there is any way out of a difficulty which will not involve the slightest addition to the enacted law that will be the way followed by judicial decision. This attitude is a complete reversal of that which once prevailed in the courts, when the law embodied in decided cases, pure drawn from the fountains of justice, was deemed superior in dignity to the enactments of an unlearned parliament. The tribunals, in so far as they now make law, operate much more freely on the cases than on the statutes.

The consequence of this relation of the judiciary and the legislature is that, while great reforms are no doubt accelerated, small reforms have to wait. Parliament does in a single session that which would have taken ages to accomplish under the natural agencies of equity and fiction, and much which would never have been brought about by these agencies at all. But the capacity of Parliament is limited, and so is its foresight. The work of legislation is left incomplete, and the judicature carefully avoids completing it, leaving the legislature to take it up again when it may. An instance in point is the late history of the law of evidence. This portion of the law grew to maturity in the courts, whose creation it was. It has been wholly transformed by direct legislative enactment (under the influence of Benthamite principles), act after act being passed as occasion pointed out defects in what had already been accomplished. One of the latest acts on the subject simply enables parties and their husbands or wives to give evidence in a certain class of indictments. The substitution of an affirmation for an oath has been carried out in the same piecemeal fashion, the courts refraining from developing the principle of the amendments, as they would have done if the movement had originated with themselves and in an earlier stage of their history. The most portentous example of the intervention of the legislature to complete the exact details of its enactments is the act previously noticed, which orders the word "this" to be interpreted as "that." The defects of existing legislative methods in England result in some defects in the form of the law, which the tribunals are free to criticise but not to correct. An act of Parliament bears upon its face the marks of the tumultuous discussion of a large popular assembly, and of the compromise which reconciles the opposing views of the two Houses. Very few acts, no matter what care may be employed in framing them, are promulgated in the form best suited for actual exercise—in the form which would be given to them by an intelligent legislator, charged with the expression of the principle which parliament is supposed to have sanctioned.

In what has been said regarding the relations of the legislature and the judicature, it is not implied that the manufacture of case-law by the latter has ceased. On the contrary, it goes on with yearly increasing volume, and the immense accumulation of decided cases is one of the evils of the present state of the law. The hand of precedent never laid heavier on the conscience of the judge than it does now. The necessary literature of law is increased by a dozen large volumes every year. The law becomes more voluminous without becoming more elastic or more systematic. The stereotyped judicial habit is to follow absolutely the precedents set by every tribunal of higher rank, and almost absolutely those set by tribunals of coördinate rank. A careful semi-official record has taken the place of the private reports published by lawyers privileged by the courts to take notes of their proceedings. Every case of any importance is recorded and becomes a precedent which the practicing lawyer in future must know, and which the judge must follow. The minute detail into which legal literature is thus made to descend is becoming an intolerable load; and it is a question whether some revolution in respect to precedents is not becoming necessary.

Legislation by judges has its counterpart in the use of legislative forms for judicial purposes. Long after legislative and judicial functions have been separated, we find legislative acts serving the purpose of judicial decisions. The history of English law is full of examples, the best known of which is that of divorce. The practice of passing private bills of divorce, at a time when the technical law did not allow of that remedy, hardened into a purely judicial practice. The act which established the Divorce Court did not in effect do more than create a new and better tribunal.

Comparative jurisprudence, in the sense in which it is distinguishable from historical jurisprudence, can scarcely be said as yet to have a separate existence. Since Leibnitz projected his youthful scheme for tabulating the laws of all the countries of the world, and exhibiting their correspondence and differences by parallel columns, little or nothing has been done for the comparison of laws except in connection with history. One special line of study does indeed use what may be called a comparative method. The "conflict of laws" involves at least a contrast of a vast number of important points in which the laws of different nations disagree. The object of the study of this conflict is of the practical kind which comparative jurisprudence as here conceived is meant to subserve. It is to develop some *rationale* of decisions where two or more discordant rules claim exclusive application to the case. There are circumstances which seem to show that the mere comparison of laws with no other object but that of discovering in how many ways the same thing can be done, and which way is the best, will enter more and more into the higher legal studies. For one thing, the vast increase which has taken place in the means of communication between nations has made a knowledge of each other's laws a matter of imperative necessity, and has broken down, at least as between the most advanced nations, that barrier of insularity which formerly shut out all suggestions of improvement from abroad.

LAW, JOHN, best known as the originator of what is usually called the Mississippi scheme, was born at Edinburgh in April, 1671. John lived at home until he was twenty, and then went to London. He had already studied mathematics, and the theory of commerce and political economy, with much interest; but he was known rather as a fop than as a scholar. In London he gambled, drank, and flirted till, in April, 1694, a love intrigue resulted in a duel. He killed his antagonist, and was arrested, tried, found guilty, and condemned to death. His life was spared, but he was detained in prison. He found means to escape, and fled to Holland, then the greatest commercial country in Europe. Here he observed with close attention the practical working of banking and financial business, and conceived the first ideas of his celebrated "system." After a few years spent in foreign travel, he returned to Scotland, then exhausted and enraged by the failure of the Darien expedition (1695-1701). He propounded plans for the relief of his country in a work entitled *Money and Trade Considered, with a Proposal for Supplying the Nation with Money* (1705). This attracted some notice, but had no practical effect, and Law again betook himself to wandering over the Continent. He visited Brussels, Paris, Vienna, Genoa, Rome, making large sums by gambling and speculation, and spending them in a lavish and reckless manner. He was in Paris in 1708, and made some proposals to the government as to their financial difficulties, but Louis XIV. declined to treat with a "Huguenot," and D'Argenson, chief of the police, had him expelled the city as a suspicious character. He had, however, become intimately acquainted with the duke of Orleans, and when in 1715 the king died, and that prince became regent, Law at once returned to the French capital. The extravagant expenditures of the late monarch had plunged the kingdom into apparently inextricable financial confusion. The debt was 3,000,000,000 livres, the estimated annual expenditure, exclusive of interest payments, 148,000,000 livres, and the income about the same.

The advisability of declaring a national bankruptcy was seriously discussed, and though this plan was rejected measures hardly less violent were resorted to. By a *visa*, or examination of the state liabilities by a committee with full powers of quashing claims, the debt was reduced nearly a half, the coin in circulation was ordered to be called in and reissued at the rate of 120 for 100—a measure by which foreign coiners profited greatly; and a chamber of justice was established to punish speculators, to whom the difficulties of the state were ascribed. These measures had so little success that the *billets d'état* which were issued as part security for the new debt at once sank 75 per cent. below their nominal value. At this crisis Law came forward and unfolded a vast scheme to the perplexed regent. A royal bank was to be founded. It was to manage the trade and currency of the kingdom, to collect the taxes, and free the country from debt. The council of finance then under the duke of Noailles, opposed the plan, but the regent allowed Law to go on with part of it in a tentative way. By an edict of May 2, 1716, a private institution called *La Banque Générale*, and managed by Law, was founded. The capital was 6,000,000 livres, divided into 1,200 shares of 5,000 livres, payable in four installments, one-fourth in cash, three-fourths in *billets d'état*. It was to perform the ordinary functions of a bank, and had power to issue notes payable at sight in the weight and value of the money mentioned at day of issue. The bank was a great and immediate success. By providing for the absorption of part of the state paper it raised to some extent the credit of the government. The notes were a most desirable medium of exchange, for they had the element of fixity of value, which was, owing to the arbitrary mint decrees of the government, wanting in the coin of the realm. They were also found the most convenient instruments of remittance between the capital and the provinces, and they thus developed and increased the industries of the latter. The rate of interest, previously enormous and uncertain, fell first to 6 and then to 4 per cent.; and when another decree (April 10, 1717,) ordered collectors of taxes to receive notes at payment, and to change them for coin at request, the bank so rose in favor that it had soon a note issue of 60,000,000 livres. Law now gained the full confidence of the regent, and was allowed to proceed with the development of the "system."

The trade of the large and fertile region in North America about the Mississippi had been granted to a speculator named Crozart. He found the undertaking too large, and was glad to give it up. By a decree of August, 1717, Law was allowed to establish the *Compagnie des Indes-Occidentales*, and to endow it with privileges practically amounting to sovereignty over the most fertile region of North America. The capital was 100,000,000 livres, divided into 200,000 shares of 500 livres. The payments were to be one-fourth in coin and three-fourths in *billets d'état*. On these last the government was to pay 3,000,000 livres interest yearly to the company. As the state paper was depreciated the shares fell much below par. On December 4, 1718, the bank became a government institution under the name of *La Banque Royale*. Law was director, and the king guaranteed the notes. The shareholders were repaid in coin, and, to widen the influence of the new institution, the transport of money between towns where it had branches was forbidden. The paper issue now reached 110,000,000. Law had such confidence in the success of his plans that he agreed to take over shares in the Mississippi company at par at a near date. The shares began rapidly to rise. The next move was to unite the companies *Des Indes Orientales* and *De Chine*, founded in 1664 and 1713 respectively, but now dwindled away to a shadow, to his company. The united association was called *La Compagnie des Indes;* it had practically the monopoly of the foreign trade of France. These proceedings necessitated the creation of new capital to the nominal amount of 25,000,000 livres. The payment was spread over twenty months. It required four of the old shares and a premium of 50 livres to obtain a new one. All these 500 livre shares rapidly rose to 750, or 50 per cent. above par. Law now turned his attention to the obtaining of additional powers within France itself. On July 25, 1719, an edict was issued granting the company for nine years the management of the mint and the coin issue. For this privilege the company paid 5,000,000 livres, and the money was raised by a new issue of shares of the nominal value of 500 livres, but with a premium of other 500. The list was only open for twenty days, and five of the former shares were required to obtain a new one. At the same time two dividends per annum of 6 per cent. each were promised. Again, there was an attempt to ruin the bank by the commonplace expedient of making a run on it for coin; but the conspirators had to meet absolute power managed with fearlessness and skill. An edict appeared reducing, at a given date, the value of money, and those who had withdrawn coin from the bank hastened again to exchange it for the more stable notes. Public confidence in Law was increased, and he was enabled rapidly to proceed with the completion of the system. A decree of August 27, 1719, deprived a rival company of the farming of the revenue, and gave it to the *Compagnie des Indes* for nine years in return for an annual payment of 52,000,000 livres. Thus at one blow the anti-system was crushed. One thing yet remained; Law proposed to take over the national debt, and manage it on terms advantageous to the state. The mode of transfer was this: The debt was over 1,500,000,000 livres. Notes were to be issued to that amount, and with these the state creditors were to be paid in a certain order. Shares were to be issued at intervals corresponding to the payments, and it was expected that the notes would be used in buying these. The government was to pay 3 per cent. for the loan. It had formerly been bound to pay 80,000,000; it would now pay under 50,000,000, a clear gain of over 30,000,000. As the shares of the company were almost the only medium for investment, the transfer would be surely effected. The creditors would now look to the government payments and the commercial gains of the company for their annual returns. Indeed, the creditors were often not able to procure the shares, for each succeeding issue was immediately seized upon. The third, on October 2d, for 500,000,000, divided into shares of (with premiums) 5,000 livres each, was taken up as eagerly as its predecessors, and the shares immediately resold at 8,000 livres in the Rue Quincampoix, then used as a bourse. They went on rapidly rising as new privileges were still granted to the company. Law had now more than regal power. The exiled Stuarts paid court to him; the proudest aristocracy in Europe humbled themselves before him; and his liberality made him the idol of the populace. After, as a necessary preliminary, becoming a Catholic, he was made controller-general of the finances in place of D'Argenson, who was removed to make way for him. Finally, in February, 1720, the bank was in name as well as in reality united to the company.

The system was now complete; but it had already begun to decay. In December, 1719, it was at its height. The shares then had mounted to 20,000 livres, forty times their nominal price. A sort of madness possessed the nation. Men sold their all, and hastened to Paris to speculate. The population of the capital was increased by an enormous influx of provincials and foreigners. Trade received a vast though unnatural impulse. Everybody seemed to be getting richer, no one poorer. Those who could still reflect saw that this prosperity was not real. The whole issue of shares at the extreme market price valued 12,000,000,000 livres. It would require 500,000,000 annual revenue to give a 5 per cent. dividend on this. Now, the whole income of the company as yet was hardly sufficient to pay 5 per cent. on the original capital of 1,677,000,000 livres. The receipts from the taxes, etc., could be precisely calculated, and it would be many years before the commercial undertakings of the company—with which only some trifling beginning had been made—would yield any considerable return. People began to sell their shares, and to buy coin, houses, land—anything that had a stable element of value in it. There was a rapid fall in the shares, a rapid rise in all kinds of property, and consequently a rapid depreciation of the paper money. Law met these new tendencies by a succession of the most violent edicts. The notes were to bear a premium over specie. Coin was only to be used in small payments, and only a small amount was to be kept in the possession of private parties. The use of diamonds, the fabrication of gold and silver plate, was forbidden. A dividend of 40 per cent. on the original capital was promised. By several ingenious but fallaciously reasoned pamphlets Law endeavored to restore public confidence. The shares still fell. At last, on March 5th, an edict appeared fixing the price of these at 9,000 livres, and ordering the bank to buy and sell them at that price. The fall now was transferred to the notes, of which there were soon over 2,500,000,000 livres in circulation. A large proportion of the coined money was removed from the kingdom. Prices rose enormously. There was everywhere distress and complete financial confusion. Law became an object of popular hatred. He lost his court influence, and was obliged to consent to a decree (May 21, 1720) by which the notes and consequently the shares were reduced to half their nominal value. This created such a commotion that its promoters were forced to recall it, but the mischief was done. What confidence could there be in the depreciated paper after such a measure? Law was removed from his office, and his enemies proceeded to demolish the system. A vast number of shares had been deposited in the bank. These were destroyed. The notes were reconverted into government debt, but there was first a *visa* which reduced that debt to the same size as before it was taken over by the company. The rate of interest was lowered, and the government now only pledged itself to pay 37,000,000 instead of 80,000,000 annually. Finally the bank was abolished, and the company reduced to a mere trading association. By November the system had disappeared. With these last measures, Law, it may well be believed, had nothing to do. He left France secretly in December, 1720, resumed his wandering life, and died at Venice, poor and forgotten, March 21, 1729.

LAW, William. The events of the life of this remarkable man may be very briefly stated. He was born in 1686 at King's Cliffe; in 1705 he entered as a sizar at Emmanuel College, Cambridge; in 1711 he was elected fellow of his college and received holy orders, and in 1712 he took his M. A. degree. He resided at Cambridge, taking pupils and occasional duty until the accession of George I., when his conscience forbade him to take the oaths of allegiance to the new Government and of abjuration of the Stuarts; his stanch Jacobitism had already been betrayed in a tripos speech, which brought him into trouble; and he was now deprived of his fellowship, and became a non-juror. For the next few years he is said to have been a curate in London, but the point is doubtful. In 1727 we find him domiciled at Putney as tutor to Edward Gibbon, father of the historian. In 1740 Law retired to his native village, where he had inherited from his father a house and small property. There he was presently joined by two ladies, Mrs. Hutcheson, the rich widow of his old friend, who recommended her on his death-bed to place herself under Law's spiritual guidance, and Miss Hester Gibbons, sister to his late pupil. This curious trio lived for twenty-one years a life wholly given to devotion and charity, until the death of Law in 1761.

LAWES, Henry (1595–1662), a prominent member of the school of early English musicians, which culminated in Purcell, and was nipped in the bud by his early death, was born at Dinton in Wiltshire, England.

LAWN TENNIS. See Tennis.

LAW OF NATIONS. See International Law.

LAWRENCE, a city of Kansas, the capital of

Douglas county, is situated on both sides of the Kansas river, about forty miles above its junction with the Missouri. Founded in 1854 by the Massachusetts Emigrant Aid Society as a center of the anti-slavery party, Lawrence was at first retarded in its development by the disturbed condition of the State; but its population rapidly increased from 1860 and is now (1900), 10,862. It is a considerable railway junction, has a good trade, and numbers among its manufacturing establishments a pork-packing concern, planing-mills, foundries, carriage works, grist-mills, and breweries. A dam has been constructed across the Kansas. In 1862–63 the State university was settled at Lawrence, the buildings occupying a fine site on Mount Oread, a bluff in the southwest part of the city; in 1880 it had fourteen teachers and 438 students. In 1856 Lawrence was sacked and partially burned by a party of soldiers and Missourians claiming to act with the sanction of the U. S. Government, and in 1863, during the civil war, it was captured and burned by a Confederate guerrilla force.

LAWRENCE, a city of Massachusetts, one of the county seats of Essex county, twenty-six miles by rail north of Boston, on the Merrimack, about thirty-five miles from its mouth. The greater part lies on the north side of the river, to the west of the Spicket. Lawrence is emphatically a manufacturing town, and its rise and rapid development are mainly due to the abundant water-power supplied by the dam across the Merrimack and distributed by a canal a mile long and fourteen feet deep. This is the property of the Essex Company, which was incorporated in 1845, and spent $250,000 on the construction of the dam—a piece of granite masonry 1,629 feet in length. The Bay State Woolen Mills (capital $2,000,000) and the Atlantic Cotton Mills (capital $1,800,000), both chartered in 1846, were the first great establishments to take advantage of the position. The Lawrence Duck Company and the Pacific Mills (capital $300,000 and $2,500,000) followed in 1853; the Washington Mills ($1,650,000), taking the place of the Bay State, in 1858; the Everett ($800,000) and the Pemberton Mills ($450,000) in 1860, the Lawrence Woolen Company in 1863, the Arlington in 1865. There are now eight large "corporations," the largest of which, the Pacific Mills, alone employs 5,800 operatives, and produces weekly 1,500,000 yards of cloth, printed or dyed. In 1900 the total number of manufacturing establishments was 546, with a combined capital of $50,000,000, and turning out products for the year to the value of $44,703,278. The industries include the manufacture of cotton goods, worsted goods, flouring and grist mill products, foundry and machine shop products, etc. There are a number of large paper-mills in the town, as well as establishments for the manufacture of steam-engines, carriages, sewing machines, cordage, earthenware. There are three public parks, one (seventeen and one-half acres) in the heart of the city. Water works, deriving their supplies from the Merrimack, were opened in 1876 at a cost of $1,700,000; the people had previously depended on wells and cisterns for drinking water. The population in 1850 was 8,232; in 1860, 17,669; in 1870, 28,921; the twelfth census of 1900 returned a population of 62,559.

LAWRENCE (LAURENTIUS, LORENZO), ST., according to Pope Leo the Great, whose account is that given also in the Roman Breviary, was a deacon, who in a time of persecution had been called on by the magistrate to give up the treasures committed to his keeping, and who thereupon had produced the church's poor, who were his special charge. Next, for his firmness in refusing to renounce Christ, he was subjected to scourging and laceration, and finally roasted to death on a gridiron. The fact of the martyrdom of St. Lawrence seems to be well established, the most probable date being August 10, 258. The earliest extant mention of the event occurs in the writings of St. Ambrose. Lawrence and his martyrdom have been favorite subjects for artistic treatment.

LAWRENCE, JOHN LAIRD MAIR LAWRENCE, BARON, viceroy and governor-general of India, was born at Richmond, Yorkshire, March 24, 1811. His father, Col. Alexander Lawrence, volunteered the forlorn hope at Seringapatam in presence of Baird and of Wellington, whose friend he became. His mother, Letitia Knox, was a collateral descendant of John Knox. To this couple were born twelve children, of whom three became famous in India, Sir George St. Patrick, Sir Henry (noticed below), and Lord Lawrence. Irish Protestants, the boys were trained at Foyle College, Derry, and at Clifton, and received commissions from their mother's cousin, Mr. Huddleston, who had been the friend of Schwartz in Tanjore. In 1829, when only seventeen, John Lawrence landed at Calcutta; he mastered the Persian language at the college of Fort William, and was sent to Delhi, on his own application, as assistant to the collector. The position was the most dangerous and difficult to which a Bengal civilian could be appointed at that time. His keen insight and sleepless energy at once detected the murderer of his official superior, William Fraser, in 1835, in the person of the nawab of Loharu, whose father had been raised to the principality by Lake, and the assassin was executed. The first twenty years, from 1829 to 1849, during which John Lawrence acted as the magistrate and land revenue collector of the most turbulent and backward portion of the Indian empire as it then was, formed the period of the reforms of Lord William Bentinck. In 1833 Mertins Bird and Thomason introduced the system of thirty years' leases, based on a careful survey of every estate by trained civilians, and on the mapping of every village holding by native subordinates. These two revenue officers created a school of enthusiastic economists who rapidly registered and assessed an area as large as that of Great Britain, with a rural population of 23,000,000, Of that school John Lawrence proved the most ardent and the most renowned. Intermitting his work at Delhi, he became land revenue settlement officer in the district of Etawah, and there began, by buying out or getting rid of the talukdars, to realize the ideal which he did much to create throughout the rest of his career—a country "thickly cultivated by a fat, contented yeomanry, each man riding his own horse, sitting under his own fig-tree, and enjoying his rude family comforts." This and a quiet, persistent hostility to the oppression of the people by their chiefs formed the two features of his administrative policy throughout life.

It was fortunate for the British power that, when the first Sikh war broke out, John Lawrence was still collector of Delhi. The critical engagements at Firozsháh, following Mudki, and hardly redeemed by Aliwál, left the British army somewhat exhausted at the gate of the Punjab, in front of the Sikh entrenchments on the Sutlej. For the first seven weeks of 1846 there poured into camp, day by day, the supplies and munitions of war which this one man raised and pushed forward, with all the influence acquired during fifteen years of an iron yet sympathetic rule in the land between the Sutlej and the Jumna. The crowning victory of Sobraon was the result, and at thirty-five Lawrence became commissioner of the Jalandhar Doab, the fertile belt of hill and dale stretching from the Sutlej north to the Indus. The still youthful civilian did for the newly annexed territory what he had long before accomplished in and around

Delhi. He restored it to order, without one regular soldier.

The marquis of Dalhousie had to devise a government for a warlike population now numbering 23,000,000, and covering an area little less than that of the United Kingdom. The first results were not hopeful (see next article), and it was not till John Lawrence became chief commissioner, and stood alone face to face with the chiefs and people and a ring fence of still untamed border tribes, that there became possible the most successful experiment in the art of civilizing turbulent millions which history presents. The province was mapped out into districts, now numbering thirty-two, in addition to thirty-six tributary states, small and great. To each the thirty years' leases of the northwest settlement were applied, after a patient survey and assessment by skilled officials ever in the saddle or the tent. The revenue was raised on principles so fair to the peasantry that Ranjit Singh's exactions were reduced by a fourth, while agricultural improvements were encouraged. For the first time in its history since the earliest Aryan settlers had been overwhelmed by successive waves of invaders, the soil of the Punjab came to have a marketable value, which every year of British rule has increased.

Seven years of such work prepared the lately hostile and always anarchic Punjab under such a pilot as John Lawrence not only to weather the storm of 1857, but to lead the older provinces into port. On May 12th the news of the tragedies at Meerut and Delhi reached him at Rawal Pindi. The position was critical in the last degree, for of 50,000 native soldiers 38,000 were Hindustanis of the very class that had mutinied elsewhere, and the British troops were few and scattered. For five days the fate of the Punjab hung upon a thread, for the question was, Could the 12,000 Punjabis be trusted and the 38,000 Hindustanis be disarmed? Not an hour was lost in beginning the disarming at Lahore; and, as one by one the Hindustani corps succumbed to the epidemic of mutiny, the sepoys were deported or disappeared, or swelled the military rabble in and around the city of Delhi. The remembrance of the ten years' war which had closed only in 1849, a bountiful harvest, the old love of battle, the offer of good pay, but, above all, the personality of Lawrence and his officers, raised the Punjabi force into a new army of 59,000 men, and induced the non-combatant classes to subscribe to a six per cent. loan. Delhi was invested, but for three months the rebel city did not fall. Under John Nicholson Lawrence sent on still more men to the siege, till every available European and faithful native soldier was there, while a movable column swept the country, and the border was kept by an improvised militia. At length, when even in the Punjab confidence became doubt and doubt distrust, and that was passing into disaffection, John Lawrence was ready to consider whether we should not give up the Peshawar valley as a last resource, and send its garrison to recruit the force around Delhi. Another week and that must have been faced. But on September 20th the city and palace were again in British hands, and the chief commissioner and his officers united in ascribing "to the Lord our God all the praise due for nerving the hearts of our statesmen and the arms of our soldiers." As Sir John Lawrence, Bart., G. C. B., with the thanks of parliament, the gratitude of his country, and a life pension of £2,000 a year in addition to his ordinary pension of £1,000, the "Savior of India" returned home in 1859. While guarding the interests of India and its people as a member of the secretary of state's council, he was sent out again in 1864 as viceroy and governor-general on the resignation and death of Lord Elgin.

On his final return to England, early in 1869, after forty years' service in and for India, he was created Baron Lawrence of the Punjab, and of Grately, Hants. He assumed the same arms and crest as those of his brother Henry, with a Pathan and a Sikh trooper as supporters, and took as his motto, "Be ready," his brother's being "Never give in." For ten years he gave himself to the work of the London school board, of which he was the first chairman, and of the Church Missionary Society. Latterly his eyesight failed, and on June 27, 1879, he died at the age of sixty-eight. He was buried in the nave of Westminster Abbey, beside Clyde, Outram, and Livingstone.

LAWRENCE, SIR HENRY MONTGOMERY, one of the greatest military statesmen of India, and provisional governor-general in the mutiny of 1857, was born at Matura, Ceylon, on June 28, 1806 (see last article). He inherited his father's stern devotion to duty and Celtic impulsiveness, tempered by his mother's gentleness and power of organization. Early in 1823 he joined the Bengal Artillery at the Calcutta suburb of Dum Dum, where also Havelock was stationed about the same time. The two officers pursued a very similar career, and developed the same Puritan character up to the time that both passed away at Lucknow in 1857. In the first Burmese war Henry Lawrence and his guns formed part of the Chittagong column which General Morrison led over the jungly hills of Arakan, till fever decimated the officers and men, and the lieutenant found himself at home again, wasted by a disease which never left him. On his return to India with his younger brother John, in 1829, he was appointed revenue surveyor by Lord William Bentinck. He was recalled to a brigade by the outbreak of the first Afghan war toward the close of 1838. As assistant to Sir George Clerk, he now added to his knowledge of the people political experience in the management of the district of Firozpur; and when disaster came he was sent to Peshawar in order to push up supports for the relief of Sale and the garrison of Jalalabad. The war had been begun under the tripartite treaty signed at Lahore, June 20, 1838. But the Sikhs were slow to play their part when the calamities in Afghanistan made it possible that the British might be driven south of the Jumna. No one but Henry Lawrence could manage the disorderly contingent which they reluctantly supplied to Pollock's avenging army in 1842. He helped to force the Khyber Pass on April 5th, playing his guns from the heights, for twenty-eight miles. In recognition of his services Lord Ellenborough appointed him to the charge of the charming valley of Dehra Dun and its hill stations, Mussuri and Landaur, where he first formed the idea of asylums for the children of European soldiers. Soon he received the well-paid office of resident at the protected court of Nepal, amid the rest of which, assisted by his noble wife, he began a series of contributions to the *Calcutta Review*, a selected volume of which forms an Anglo-Indian classic. There, too, he elaborated his plans which resulted in the erection and endowment of the noblest philanthropic establishments in the East—the Lawrence military asylums at Sanáwar (on the road to Simla), at Murree in the Punjab, at Mount Abu in Rajputana, and on the Madras Nilgiris. From 1844 to his death he devoted all his comparatively large income, above a modest pittance for his children, to this and other forms of catholic Christian charity.

The *Review* articles led the new governor-general, Lord Hardinge, to summon Lawrence to his side during the first Sikh war. For the next four years he virtually became Ranjit Singh's successor in the government of the Punjab. After the doubtful triumphs of Mudki and Firozshah, Lawrence was summoned from Nepal to take the place of the heroic Major George Broadfoot, who had fallen. Aliwal came; then the guns of Sobraon chased the demoralized Sikhs across the Sutlej. All through the smoke Lawrence was at the side of the chivalrous governor-general. He gave his voice, not for the rescue of the people from anarchy by annexation, but for the reconstruction of the Sikh government, and was himself appointed resident at Lahore, with power "over every department and to any extent" as president of the council of regency till the maharaja Dhalip Singh should come of age. Soon disgusted by the "venal and selfish durbar" who formed his Sikh colleagues, he summoned to his side assistants like Nicholson, James Abbott, and Edwardes, till they all did too much for the people, as he regretfully confessed. Wearied out, he went home with Lord Hardinge, and was made K.C.B., when the second Sikh war summoned him back at the end of 1848 to see the whole edifice of Sikh "reconstruction" collapse. It fell to the marquis of Dalhousie to proclaim the Punjab up to the Khyber British territory on March 29, 1849. But still another compromise was tried. As the best man to reconcile the Sikh chiefs to the inevitable, Henry Lawrence was made president of the new board of administration with charge of the political duties, and his brother John was intrusted with the finances. John could not find the revenue necessary for the rapid civilization of the new province so long as Henry would, for political reasons, insist on granting life pensions and alienating large estates to the needy and sensual remnants of Ranjit Singh's court. Lord Dalhousie removed Sir Henry Lawrence to the charge of the great nobles of Rajputana, and installed John as chief commissioner. If resentment burned in Henry's heart, it was not against his younger brother, who would fain have retired.

In the comparative rest of Rajputana he once more took up the pen as an army reformer. In March and September, 1856, he published two articles, called forth by conversations with Lord Dalhousie at Calcutta, whither he had gone as the hero of a public banquet. The governor-general had vainly warned the home authorities against reducing below 40,000 the British garrison of India even for the Crimean campaigns, and had sought to improve the position of the sepoys. Lawrence pointed out the latent causes of mutiny, and uttered warnings only to be too soon justified. In March, 1857, he yielded to Lord Canning's request that he should then take the helm at Lucknow, but it was too late. In ten days his rule put down administrative difficulties indeed, as he had done at Lahore. But what could even he effect with only 700 European soldiers, when the epidemic spread after the Meerut outbreak of mutiny on May 10th? In one week he had completed those preparations which made the defense of the Lucknow residency forever memorable. Amid the deepening gloom Lord Canning ever wrote home of him as a "tower of strength," and he was appointed provisional governor-general. On May 30th mutiny burst forth in Oudh. On June 29th, pressed by fretful colleagues, and wasted by unceasing toil, he led 336 British soldiers with eleven guns and 220 natives out to Chinhat to reconnoiter the insurgents, when the natives joined the enemy and the residency was besieged. On July 2d, as he lay exhausted by the day's work and the terrific heat in an exposed room, a shot struck him, and in forty-eight hours he was no more.

LAWRENCE, Sir Thomas, was born at Bristol on May 4, 1769. His debut as a crayon portrait painter was made at Oxford, where he was well patronized, and in 1782 the family settled in Bath, where the young artist soon found himself fully employed in taking crayon likenesses of the fashionables of the place at a guinea or a guinea and a half a head. In 1784 he gained the prize and silver gilt palette of the Society of Arts for a crayon drawing after *Raphael's Transfiguration*, came to London in 1787, was kindly received by Reynolds, and entered as a student at the Royal Academy. He began to exhibit almost immediately, and his reputation increased so rapidly that he became an associate of the Academy in 1791. The death of Sir Joshua in 1792 opened the way to further successes. He was at once appointed painter to the Dilettanti Society, and principal painter to the king in room of Reynolds. In 1794 he was a Royal Academician, and he became the fashionable portrait painter of the age, having as his sitters all the rank, fashion, and talent of England, and ultimately most of the crowned heads of Europe. In 1815 he was knighted in 1818 he went to Aix-la-Chapelle to paint the sovereigns and diplomatists gathered there, and extended his residence on the Continent by visiting Vienna and Rome. After eighteen months he returned to England, and on the day of his arrival was chosen president of the Academy in room of West, who had died a few days before. This office he held from 1820 to his death on January 7, 1830.

LAWRENCEBURG, the capital of Dearborn county, Ind., is situated on the Ohio river, twenty-two miles below Cincinnati, and at the junction of several railroads. It contains two national banks, two newspaper offices, a brewery, several distilleries and some manufactories. Population (1900), 4,326.

LAYAMON, or Laweman, the author of a chronicle of Britain, entitled *Brut*, a poetical semi-Saxon paraphrase of the *Brut d'Angleterre* of Wace, was, as he himself informs us, a priest, who read the services of the church at Ernleye, on the banks of the Severn (now Lower Arley or Arley Regis, three and a half miles southeast from Bewdley, Worcestershire). Of his personal history nothing further is known.

LAYBACH. See Laibach.

LAYNEZ, Diego. See Jesuits.

LAZARITES, Lazarists, or Lazarians. The origin of the "Congregation of Priests of the Mission" may in some sense be traced back to 1617, the year of the successful labors of St. Vincent de Paul, assisted by five other priests, for the evangelization of the common people in the parish of Châtillon-sur-Chalaronne, near Bourg. More immediately it dates from 1625, when the little community acquired a permanent settlement in the Collége des Bons Enfans in Paris. Archiepiscopal recognition was obtained in 1626; and by papal bull in January, 1632, the society was constituted a congregation, with St. Vincent de Paul at its head. Shortly afterward the establishment was confirmed by letters patent from Louis XIII. At the French Revolution they were dispersed, so far as France was concerned, but permitted to reappear under the empire, and rehabilitated at the Restoration. In Sardinia they had a similar history. Throughout Italy they have been affected by recent political changes, just as the rest of the religious orders have been. The Lazarist province of Poland was singularly prosperous; at the date of suppression in 1796 it possessed thirty-five establishments. The order was permitted to return in 1816, but is now extinct there. In Madagascar it had a mission from 1648 till 1674. In 1784 Lazarists were appointed to take the place of the Jesuits in the Levantine and Chinese missions; they still have some footing in China, and in 1874 their establishments throughout the Turkish empire numbered sixteen. In the same year they had fourteen establishments in the United States of America. The total number of Lazarists throughout the world is computed at about 3,000.

LAZARUS, St., Order of. This religious and military order dates its origin from the occupation of Jerusalem by the first crusaders, its primary object being the succor of the leprous, of whom Lazarus was regarded as the patron. After the expulsion of the crusaders the hospitalers of St. Lazarus established themselves in France. The gradual disappearance of leprosy combined with other causes to change the order into a purely civil corporation. In 1572 it was in Savoy merged by Gregory XIII. in the order of St. Maurice. In 1608 it was in France united with that of Notre-Dame du Mont-Carmel; abolished at the Revolution, it was reintroduced at the Restoration, but is again in abeyance, the only order at present conferred or recognized being that of the Legion of Honor.

LEAD. This metal was known to the ancients, and is mentioned in the Old Testament. The Romans used it largely, as it is still used, for the making of water pipes, and soldered these with an alloy of lead and tin. Of the various plumbiferous minerals, galena (a compound of lead and sulphur), and white lead ore or cerusite, might almost be said to be the only ones which come into consideration as lead ores. Galena, the principal lead ore of the Old World, is a dark-colored metallic-looking compact solid, crystallizing in cubes or other forms of the regular system, but often presenting itself in non-crystallized granular masses. Galena occurs in veins in the Cambrian clay-slate, accompanied by copper and iron pyrites, zinc-blende, quartz, calcspar, iron-spar, etc.; also in beds or nests within sandstones and rudimentary limestones, and in a great many other geological formations. It is pretty widely diffused throughout the earth's crust.

The native carbonate occasionally presents itself in the form of pure crystals, but more frequently in a state of intimate intermixture with clay, limestone, oxide of iron, etc. (as in the ores of Nevada and Colorado), and sometimes also with coal ("black lead ore"). All native carbonate of lead seems to be derived from what was originally galena, which, in fact, is always present in it as an admixture. This ore, metallurgically, was not reckoned of much value, until immense quantities of it were discovered in Nevada and in Colorado. The Nevada mines are mostly grouped around the city of Eureka. The ore there occurs in "pockets" disseminated at random through limestone. The dimensions of these pockets are very variable; one is quoted measuring 300 by 60 by 180 feet. The crude ore contains about 30 per cent. of lead and 0.2 to 0.3 per cent. of silver. The Colorado lead district is situated high up in the Rocky mountains, a few miles from the source of the Arkansas river. The ore was discovered as late as 1877 by a mining engineer, Stephens. It forms gigantic deposits of almost constant thickness, imbedded between a floor of limestone and a roof of porphyry. Stephens' discovery was the making of the city of Leadville, which in 1878, within a year of its birth, had over 10,000 inhabitants. The Leadville ore contains from 24 to 42 per cent. of lead and 0.1 to 2 per cent. of silver. In Nevada and Colorado the ore is worked chiefly for the sake of the silver; but this industry, especially since 1878, has developed at such a rate as to seriously affect the price of lead even in Europe. Of other American lead districts the most important are those of Utah, of Missouri, and of the Upper Mississippi, where the ore consists substantially of galena.

The extraction of the metal from pure (or nearly pure) galena is the simplest of all metallurgical operations. The ore is roasted (*i.e.*, heated in the presence of atmospheric oxygen) until all the sulphur is burned away and the lead left. This simple statement, however, correctly formulates only the final result. The first effect of the roasting is the elimination of sulphur as sulphurous acid, with formation of oxide and sulphate of lead. In practice this oxidation process is continued until the whole of the oxygen is as nearly as possible equal in weight to the sulphur present as sulphide or as sulphate. The heat is then raised in (relative) absence of air, when the two elements named unite into sulphurous acid, while a regulus of molten lead remains.

LEADVILLE, a flourishing mining-town, capital of Lake county, Colo., is situated at a height of 10,200 feet above the sea, on a narrow plateau between the Saguache or Continental Divide and the Park Range of the Rocky Mountains, about seventy miles southwest of Denver. It is connected with Denver by a branch of the Union Pacific Railway (172 miles), and by the Denver and Rio Grande Railway (279 miles). Though a place of 14,820 inhabitants at the census of 1881, Leadville was then the creation of scarcely more than three years. It has (1900) 12,455 inhabitants.

As early as 1860 gold placers were discovered in the neighborhood, and for a little time the settlement of Bough Town, as it was then called, was a busy spot in this thinly peopled region. But the gold was soon exhausted; and, though it was vaguely understood that the heavy black sand which had often proved troublesome to the gold-washers was more or less argentiferous, it was not till 1877 that the first practical attempt to turn it to account was made. No sooner, however, was the real character of the ore ascertained than eager adventurers rushed to Leadville by thousands. In August, 1877, there were not more than twenty shanties on the site of the town; but the population rapidly increased, and in less than two years numbered upward of 12,000. The first smelting furnace was set to work in October, 1877.

LEAKE, WILLIAM MARTIN (1777–1860), antiquarian typographer, was born in London.

LEAMINGTON, anciently LEAMINGTON PRIORS, or, since 1838, ROYAL LEAMINGTON SPA, is a municipal borough and watering-place of Warwickshire, England, situated two miles east from Warwick, on the Leam, near its junction with Shakespeare's Avon. Its rise dates from about 1786, when baths were first erected in connection with saline springs, which are held to possess various curative properties, and which had been noticed by Camden in 1586. But the rapid increase and continued prosperity of the town are due also, among other causes, to its beautiful and finely sheltered site, to its aristocratic neighborhood, and to the fine hunting country by which it is surrounded.

From a population of 543 in 1811 it has, with its suburbs, increased (1901) to nearly 35,000.

LEANDER. See HERO.

LEASE. See LANDLORD AND TENANT.

LEATHER consists of the hides and skins of certain animals, prepared by chemical and mechanical means in such a manner as to resist influences to which in their natural condition they are subject, and also to give them certain entirely new properties and qualities. Skins in an unprepared moist condition are readily disintegrated and destroyed by putrefaction, and if they are dried raw they become hard, horny, and intractable. The art of the leather manufacturer is principally directed to overcoming the tendency to putrefaction, to securing suppleness in the material, to rendering it impervious to and unalterable by water, and to increasing the strength of the skin and its power to resist tear and wear.

Leather is made by three processes, or with three classes of substances. Thus we have—(1) tanned leather, in which the hides and skins are combined with tannin or tannic acid; (2) tawed leather, in which skins are prepared with mineral salts; (3) shamoyed leather, consisting of skins combined with oils or fatty substances.

The skins of all mammalians may be made into leather, but in practice it is only from a few of the larger animals, readily obtainable in sufficient numbers, and reared and slaughtered for other objects, that commercial supplies are obtained. The term hides is, by tanners, restricted to the large and heavy skins of full-grown oxen, horses, and other large animals—all the lighter stock being known as skins, (calfskins, sheepskins, goatskins, etc.) Of all hides and skins used by the tanner, by far the most important and valuable are those obtained from oxen. Not only do these yield the most useful and valuable hides, but they are slaughtered in all civilized countries in enormous quantities, and, while in Europe the skins of cattle are only of secondary importance, the vast herds which roam practically wild in the plains of South America are valuable more on account of their hides and other products than as sources of animal food. Oxhides are imported into Europe and the United States of America in enormous quantities, and come principally from South America, the Cape, Australia, the East Indies, and North Africa. The main centers of the import trade in hides are Antwerp, Liverpool, Havre, and New York. For tanners' purposes, calfskins are distinguished from oxhides, and the kinds of leather into which they are manufactured are entirely distinct. Intermediate between the heavy oxhides and calfskins are East Indian kips, a medium weight skin which comes both raw and tanned from Calcutta and Madras in such large quantities as to form a distinct branch of the leather trade. Horsehides and the skins of the other *Equidæ*—the ass, zebra, quagga, etc.—have in modern times become important raw materials of leather. The various breeds of sheep, on account of the vast numbers in which their skins come into the market, and the numerous applications of sheep and lamb skins, come near in value to oxen as sources of leather. As a rule, the importance of a breed of sheep for the purposes of the tanner is in inverse proportion to its value as a source of wool. Goat and kid skins come next in order of importance, the products they yield being beautiful in texture, of high value, and of varied usefulness. Goatskins are obtained chiefly from the East Indies, the Cape, North Africa, South America, Mexico, Asia Minor, and the hilly regions of Europe. Sealskins, obtained from the Arctic regions, are an important material, while hogskins are of value for the purposes of the tanner, almost exclusively for making saddle leather. Among the skins which are only occasionally or locally used may be enumerated walrus, rhinoceros, hippopotamus, and elephant hide, yielding very thick leather used for buffing wheels in cutlery manufacture, etc., and the skins of the numerous species of deer and antelope, dogs, kangaroo, and other Australian marsupials, porpoises, alligators, and occasionally boas.

All hides and skins are externally clothed more or less with wool, hair, bristles, or scales. The skin itself has a thin superficial horny and cellular layer, the cuticle or epidermis, into which neither nerves nor blood-vessels penetrate. This layer is, during the life of the animal, continually in progress of peeling off in the form of small flat scales, and is renewed from the inner portion of the epidermis known as the Malpighian net. The skin proper, which is the only portion of the hide of use for the tanner, consists of a dense plexus of fibrous bundles, knit together and interwoven in every direction, the interspaces being filled up with an albuminoid substance. The bundles of fibers terminate on the upper surface of the corium in separate masses, producing the irregularly papillated appearance seen in the "grain" of leather, and hence that surface is distinguished as the grain side in contradistinction to the flesh or under side.

Tannin or tannic acid is a product of the vegetable kingdom, abundantly formed in a very large number of plants, and secreted in such diverse organs and members as the bark, wood, roots, leaves, seed-pods, fruit, etc. The tannin obtained from various sources is not precisely the same in its chemical relations and reactions. Doctor Stenhouse was the first to insist on the principal distinction which possesses practical interest to the tanner. He pointed out that tannin-producing bodies may be divided into two classes, the first class comprising such as by their decomposition develop into gallic acid, and by destructive distillation yield pyrogallic acid. Of these gallotannic acid, obtainable from galls, is the type. The other principal tanning materials which yield gallotannic acid are sumach, valonia, divi-divi, and myrobalans. The second class embraces tannins which do not resolve themselves into gallic acid or yield pyrogallic acid, and of this class oak bark, mimosa bark, and gambier yield characteristic types. All varieties of tannin, however, agree in possessing a powerful astringent but not bitter taste, and a distinctly acid reaction; they yield with solutions of salts of peroxide of iron a deep blue-black or green-black solution, and particularly they combine and form insoluble compounds with gelatine and with the gelatigenous tissue which constitutes the principal portion of animal skins. By the action of ether, containing a little water, or gall-nuts, pure gallotannic acid may be procured.

Tannin is in no case isolated for use as a tanning agent. It is only brought in contact with skins and hides by the medium of infusions, decoctions, or extracts of the various tanning materials in which a percentage of tannin is present mixed with coloring and other extractive material.

The substances enumerated below comprise the principal tanning materials in use throughout Europe and America.

In early times the bark of the common oak, *Quercus Robur*, was almost the only tanning material used by British tanners, and it still is the substance from which the highest quality of heavy tanned leather is prepared, although with it the process is necessarily tedious. Throughout the country there are still a few tanners of sole leather whose boast is that they use nothing but oak bark. The entire supply of British oak bark is estimated at from 200,000 to 300,000 tons annually. This quantity, with the additional import of 30,000 tons from the Continent, is altogether inadequate to meet the demands of the tanners, apart from the necessity which is now felt for forcing the tanning operation much more rapidly than was formerly the rule. The most useful bark is obtained from coppice wood of about twelve years' growth, although in inner bark of longer growth a large proportion of tannin is secreted. The amount of astringent matter in coppice bark may be taken to average from 8 to 10 per cent., but the statements of the quantities of tannin in different samples vary within wide limits, as much as 18 per cent. being in some cases found. There is no doubt that the peculiar excellence of the sole leather of England is due in great measure to the superior oak bark produced there. Oak bark imparts firmness and solidity to leather, while other sorts give softness; thus the peculiar softness of French curried leather is referred to the bark of the evergreen oak, with which the better kinds are tanned, while the other tanning materials next to be named give each its peculiar quality with respect to color, scent, toughness, or the power of resisting moisture and decay.

Other species of oak also yield tanning materials of much importance, and are extensively used. The cork oak, *Quercus Suber*, of south Europe and north Africa, in addition to its well-known external layer (the cork of commerce), possesses a fibrous inner bark which is richer in tannin than ordinary oak bark. It is much employed in France, and is imported also to some extent into the United Kingdom. In the United States several varieties of oak yield staple tanning materials. Of these the principal are the rock or chestnut oak, yellow oak or quercitron, both important sources of tanbarks; the red oak and white oak are of less consequence.

A large amount of mimosa bark goes to the English market from Australia, principally from Melbourne and Adelaide, and from Tasmania. It is obtained from a large number of trees belonging to the genus *Acacia*, widely distributed throughout Australasia, and the various barks are rich in tannin, which ranges from 15 up to 32 per cent. The qualities imported into England are the richer kinds. They amount to about 30,000 tons annually, and may be assumed to contain on an average 28 per cent. of astringent matter.

Hemlock bark is the most important tanning material in North America. It is the produce of the hemlock spruce, *Abies canadensis*, which grows in vast forests throughout Canada and the northern and eastern States of the Union, the principal bark-producing States being Pennsylvania, Michigan, and Wisconsin. Hemlock bark is obtained by cutting down the trees; and, as no provision is made for renewing the denuded forests, the strain on the more accessible portions of the American forests is already beginning to make itself apparent. The bark contains 7 or 8 per cent. of tannin, and the leather it makes has a strong reddish-brown color. A large and increasing amount of hemlock extract, an inspissated decoction of the bark having a specified richness in tannin, is now imported into Europe, principally to the United Kingdom.

The hides of oxen are received in the tanyard in four different conditions. These are (1) market or slaughter hides, which, coming direct from local abattoirs, are soft, moist, and covered with dirt and blood; (2) wet salted hides; (3) dry salted hides; and (4) sun-dried or "flint" hides—the three last forms being the condition in which the imports of foreign hides are made. The first operation in the tannery is to clean the hides, to free them from salt, and to bring the hard, dry hides to the uniformly soft, flaccid condition in which all market hides are obtained. The treatment at this stage requires skill and attention to prevent the more soluble constitutents of the hide from dissolving out in the washing and soaking processes and also to secure the complete softening of the entire substance, upon which the successful tanning greatly depends. In the case of market hides cleaning and softening are principally effected by washing and soaking in spent limewater, while for dry hides and dry salted hides brine is essential. The softening of these materials is helped and rendered thorough by working them for some time in the stocks after they have been well soaked. After being thus brought as nearly as possible into a uniform condition, all hides are treated alike. The first operation to which they are subjected is *depilation*, which removes, not only the hair, but also the scarf-skin. This is effected variously in different countries. In England the most common plan is to throw the hide or skin into a strong watery lye of slaked lime, with lime in excess. By this, in a few days, more or less, according to the proportion of lime present, the hair is easily detached, the hair-sheath having been dissolved. The hair was formerly taken off by making a sour liquor from fermented vegetable matter, in which the hides lay for several days; they were also smoked in a damp state for the same purpose; but both those methods are now abandoned. They are still sometimes, especially on the Continent, sweated, that is, they are laid in heaps and kept wet and warm, a plan which is still adopted in England for skins. In America the sweating is performed cold; the hides are hung up wet in a damp underground cellar, and are kept moist for ten days or a fortnight. In either of these sweating processes incipient putrefaction takes place sooner or later, when the hair and scarf-skin are easily removed; but the fatty matter remains, and in some cases prevents the hides from taking the tan.

There have been numerous other methods proposed and patented for unhairing skins, few of which have been received with much favor. Among the agents proposed may be mentioned caustic soda, sulphide of sodium and sulphide of calcium, borax, sugar, and charcoal—substances which it is obvious must act in very different manners. Lime and alkaline solutions not only loosen the hair and scarf-skin, but also "plump" the corium or true skin, that is, they swell it and render it consequently porous and more permeable to the tanning solution. Lime further forms with the fatty matter of the flesh side calcareous soap, thus neutralizing the fat which would otherwise interfere with the tannin. Some tanners, especially Americans, who work the so-called acid process, plump their hides by the use of sulphuric acid, hanging them six or eight hours in a solution containing $\frac{1}{500}$ of acid. The plumping is sometimes done as a preliminary operation, and again others add the acid to the color pits, or the first pit into which the hides go for the tanning process. Among non-acid tanners the plumping of sweat stock in which there is no lime is secured in the weak acid liquors of the coloring and handling pits. In the case of limed stock the hides, at the proper stage, are withdrawn from the pits and stretched over an unhairing beam, when with a working knife a workman partly scrapes partly shaves off the hair and scarf-skin. Another workman in a similar way with a fleshing knife removes the fatty compounds and flesh from the flesh side. For these operations several machines have been adapted, working mostly with revolving knives or cutters, under which the hides or skins pass in a fully extended state. Such machines are, however, only applied to the smaller skins. The next step in the preparation of the hide is to remove from it as thoroughly as possible all traces of lime. This is partly accomplished by going over the hide on the beam with a scudding knife, pressing the combined lime and interfibrous matter out of the tissue. For more complete neutralization of lime in the larger hides the influence of the weak acid of the coloring pits is trusted to. Harness hides are washed by some means in pure water, the most convenient and generally adopted method being to place them in the dash wheel, in which they revolve and tumble about while fresh water is continually being poured on them within the revolving wheel.

The hides now come to be trimmed and prepared for tanning in the shape in which they are intended ultimately to be sent into the market. An entire untrimmed hide is termed a crop; a side is half a crop.

The actual tanning now commences, and the operations involved may be divided into a series of three—(1) coloring, (2) handling, and (3) the laying away. The coloring consists in exposing the hides in a series of pits containing oozes which are almost entirely deprived of tannin, but in which some amount of gallic and acetic acid have been developed, and which, moreover, contain a large proportion of the coloring matter extracted from the tanning substances. In these pits (also called suspenders) the hides are suspended over poles laid across the pit, and they are moved daily from one to another of a series of four or six, this stage usually occupying about a week. As the hides are moved forward in the series they are exposed to a liquor containing a small and steadily increasing proportion of tannin, and this, it may be said, holds good till the hide reaches the last lay-away pit, in which the tanning is completed. The objects attained in the coloring pits are the superficial coloring or dyeing of the hide, some amount of plumping from the acids of the ooze, and a dissolving out of remaining traces of lime, principally by the acetic acid to which the hide is exposed. After coloring, the hides pass on to the handlers or handling pits, a round or series of which may consist of from four to twelve, according to the mode of working. In the handlers the hides are spread out horizontally; and in the first series they are "handled" once a day or more frequently if convenient. The handling consists of lifting the hides out of the pit by means of a tanner's hook, piling them on the side till they drain, and returning them into the pit, the hide on the top in one handling going to the bottom in the next. This operation is continued throughout the series; only as the hides advance the necessity and advantage of frequent handling decreases, while the strength of the tan liquor in which they are handled increases. The whole handling stage consumes on an average about six weeks. Finally, the hides are carried over into the layers or lay-aways. In these the stock is exposed to the strongest tanning liquors, and between the hides thin layers of the tanning bark or mixture are strewn. The object of this interstratification is to separate the mass of hides so as to secure the more ready permeation of the entire mass by the liquor, and also to feed and strengthen the ooze itself as its tannin is absorbed by the hides. In these layers the hides are allowed to rest for about six weeks, after which the pits are cleared out, charged with fresh ooze, and filled with the hides and tan as before. These processes may be repeated three or four times before the tanning is completed. When the process is deemed complete, each hide, on being taken out, will be found to be converted into leather, and a portion of its gelatin which has been dissolved from its interior is, by combination with a portion of tannin from the strong solution, deposited upon its surfaces, where it is found in the form of a yellow deposit, technically known as *bloom*, or *pitching*, which disguises the under color of the leather just as if it were covered with yellow paint. This, prejudice says, must be on its surface, or it is not salable, but it is so much quality and weight lost to the consumer, as he pays for it on the outside of his leather to be worked off in the dressing and currying operations. By some tanning agents—mimosa, for example—there is little or no bloom deposited.

From the time when the raw oxhide is taken in hand till the leather is fully dried, not less than a year is consumed in the case of the best qualities of sole leather. It was formerly the practice in England, as it still is on the Continent, to tan by the process of *stratification*, for which purpose a bed of bark is made upon the bottom of the pit; upon this is laid the hide, then bark, then a hide, and so on until the pit is full; water is sometimes pumped in, and the pit left for some months; it is then emptied, and the same hides returned with fresh bark and water for a few months longer; this is repeated again and again, until the tanning is completed, the time varying from one to four years for heavy leather.

The devices and processes which have been proposed and to some degree put in operation with the view of shortening the time occupied in tanning are beyond all enumeration. In scarcely any case have time-abridging processes proved successful in practical working, so far as the production of good leather is involved; and now the opinion appears to be completely established that, for the thorough tanning of heavy leather, a slowly operating influence and consequently long time are essential. The devices for the hastening of tanning have for the most part turned upon some plan for forcing the tan liquor into and through the pelt, or for alternate soaking and squeezing of the hides.

Heavy hides for sole leather, belting, and similar purposes do not require to undergo any elaborate dressing or currying. When finally removed from the tan pits they are piled grain to grain and flesh to flesh to drain, care being taken that no tan liquor is allowed to lurk in the pile, which is covered over from the light. When sufficiently drained, they are brushed or scoured to free them from adhering impurities, and removed to the drying loft, where, after lightly rubbing over with oil, they are hung on poles to dry. In the loft steam-heated pipes keep a dry atmosphere during winter, and enable the attendants to regulate and control the drying of the leather. The leather when dried in this condition is rough tanned, and for finishing as sole leather it has to be struck out or "pinned" and compressed by rolling. For striking or pinning by hand the hide is dampened with water, thrown over a beam, and worked all over the grain side with a striking pin. This operation smooths and levels the grain, removes smaller wrinkles, and to some extent compresses and solidifies the leather. Striking machines are now very generally used for the operation. These consist of a drum or cylinder having a parallel series of projecting knives, or plates of gun-metal, set angularly across its surface. Underneath the drum is a brass bed, fixed on a yielding cushion, which can be pressed up or eased by means of a foot lever, according as the leather operated on is thick or thin. The drum is made to revolve at a very rapid rate, the blunt edges and external angles of the knives thereby striking the surface of the leather with great violence, and thus the grain is struck out, smoothed, and compressed in a very rapid and efficient manner. Finally, the leather is rolled and compressed on a level zinc-lined wooden bed by a heavy hand roller, or on the platform of one of the numerous forms of machines designed for that purpose.

The yield of leather from a given weight of dry hide varies very much according to the different styles of tannage and materials used. As a mean outcome, it may be said that 100 pounds of green hide, tanned with from 300 to 400 of oak bark, will yield 40 to 50 pounds of leather; 100 pounds of green hide, however, when deprived of hair, flesh, and moisture, will weigh only 18 pounds, and, taking 100 pounds of dry hide, which, fleshed and unhaired, weighs 85 pounds, the yield of leather will be from 180 to 200 pounds according to tannage. The skin of the seal is light but exceedingly close in texture, and yields a very strong, tough leather.

Russia leather was originally, as the name implies, a specialty of Russia, where it was made from the hides of young cattle, and dressed either a brownish-red or a black color, for upper leather or for bookbinding, dressing-cases, purses, and similar objects. Russia leather is now made throughout both Europe and America, the best qualities being obtained from Austria. Horsehides, calf, goat, and sheep skins and even splits, are now finished as russia leather; but most of these are decidedly inferior in quality, and, as they are merely treated with birch-bark oil to give them something of the odor by which an ordinary observer recognizes russia leather, they scarcely deserve the name under which they pass. Genuine russia leather is tanned like other light leathers, but properly in willow bark, although poplar and spruce fir barks also are used. After tanning, scouring, and setting out, the hides are treated on the flesh side with an empyreumatic oil obtained by the dry distillation of birch-tree bark and buds, to which the peculiar smell of the leather is due. The red color commonly seen in russia leather is given by dyeing with a preparation of brazil wood, rubbed over the grain side with a brush or sponge. Black-colored russia leather owes its color to repeated stainings with acetate of iron. The leather of genuine quality is very water-tight and strong, and, owing to its impregnation with empyreumatic oil, it wards off the attacks of insects.

Originally morocco leather was a product of the Levant, Turkey, and the Mediterranean coast of Africa, where the leather was made from goatskins tanned with sumach, and finished either black or various bright colors. Such leather was peculiarly clear in color, elastic and soft, yet firm and fine in grain and texture, and has long been much prized for binding, being the material in which most of the artistic work of the sixteenth century binders was executed. Now, in addition to genuine morocco made from goatskins, we have imitation, or French moroccos, for which split calf, and especially sheep skins, are employed; and it may be said that, as the appearance of morocco is the result of the style of graining, which can be artificially produced on any leather, and of the finish, morocco can be made from all varieties of thin leather.

For a number of years leather tanned from the skins of the Mississippi alligator has formed an item in the trade-lists of the United States, and it is now also being sought after in European markets. The industry was started about the year 1860, and centered first at New Orleans, the raw skins being obtained from the rivers of Louisiana. Now, however, the skins are principally procured in Florida, and the tanning is a considerable industry in Jacksonville. The parts of the skin useful for leather-making are the belly and flanks, and these portions alone are steeped in lime to preserve them for the tanner. Alligator leather, which has a scaly surface, is useful for fancy boot and shoe making, and for many small articles, such as cigar-cases, pocket-books, etc.

The Australian colonists have turned their attention to the preparation of leather from the skins of the kangaroo, wallaby, and other marsupials native to their continent. These skins are both tanned and tawed, the principal tanning agent being the mimosa bark, which abounds in Australia. The leathers they yield are of excellent quality, strong, and elastic, and rival in texture and appearance the kid of European tanners. The circumstance that the animals exist only in the wild state renders this a limited and insecure source of leather.

LEATHER, Artificial. Under the name of artificial leather, or of American leather cloth, large quantities of a material having, more or less, a leather-like surface are used, principally for upholstering purposes, such as the covering of chairs, lining the tops of writing desks and tables, etc. There is considerable diversity in the preparation of the material, but most commonly it consists of a web of calico first prepared with a thick paste to fill up the interstices, and thereafter coated with a mixture of boiled linseed oil mixed with dryers and lampblack or other pigment, uniformly spread, smoothed, and compressed on the cotton surface by passing it between metal rollers. When the surface is to possess a glossy, enamel-like appearance, it receives a finishing coat of copal varnish. A grained morocco surface is given to the material by passing it between suitably embossed rollers. Another material now largely used for preparing artificial leather consists of gelatin mixed with appropriate coloring material, and such chemical agents as, by their reaction on that body, render it insoluble—calico being coated with the mixture in the manner indicated above.

LEATHERETTE, a word of American origin, used to denominate a peculiar kind of strong, fibrous textile, made by a modified process of paper-making. It is finished on one side in imitation of leather, and is used for making satchels, covering books, etc.

LEAVENWORTH, the fifth city in the State of Kansas in size, and chief town of Leavenworth County, is situated in an amphitheater formed by the bluffs of the right bank of the Missouri, in the midst of a rich agricultural country. The distance from St. Louis by river is 496 miles, and by rail 309 miles. In 1853 the site of the city was covered with thick hazelbrush, without a trace of human habitation. The following year saw the laying out of the first streets, and by 1864 the value of the taxable property, real and personal, amounted to $4,103,562. Among the principal buildings are a large Roman Catholic cathedral, a State penitentiary, and a State normal school. Its position on the river, and an extensive railway system, have given Leavenworth a flourishing trade. It possesses two practically inexhaustible mines of bituminous coal, and has more large manufacturing establishments than any other town on the Missouri, including gristmills, foundries, and manufactories of wagons, carriages, furniture, and shoes. About two miles above the city is Fort Leavenworth, the military headquarters of the department of the Missouri. The population was 7,429 in 1860, 17,873 in 1870, 19,546 in 1880; by the twelfth census of 1900, 20,735.

LEBANON. The name of Mount Lebanon, from the Semitic root *laban*, "to be white, or whitish," probably refers, not to the perpetual snow, but to the bare white walls of chalk or limestone which form the characteristic feature of the whole range. Syria is traversed by a branch thrown off almost at right angles from Mount Taurus in Asia Minor, and Lebanon is the name of the central mountain mass of Syria, extending for about 100 miles from north-northeast to south-southwest. It is bounded west by the sea, north by the plain Jún Akkár, beyond which rise the mountains of the Nusairieh, and east by the inland plateau of Syria, mainland steppe-land. To the south Lebanon ends about the point where the river Litány bends westward, and at Banias. A valley narrowing toward its southern end, and now called El-Buká'a, divides the mountainous mass into two great parts. That lying to the west is still called Jebel Libnán; the greater part of the eastern mass now bears the name of the Eastern Mountain (Jebel el-Sharki).

Lebanon and Antilibanus have many features in common; in both the southern portion is less arid and barren than the northern, the western valleys better wooded and more fertile than the eastern. In general the main elevations of the two ranges form pairs lying opposite one another; the forms of both ranges are monotonous, but the coloring splendid, especially when viewed from a distance; when seen close at hand, indeed, only a few valleys with perennial streams offer pictures of landscape beauty, their rich green contrasting pleasantly with the bare mountain sides.

The western versant has the common characteristics of the flora of the Mediterranean coast, but the eastern portion belongs to the poorer region of the steppes, and the Mediterranean species are met with only sporadically along the water-courses. Forest and pasture land in our sense of the word do not exist; the place of the first is for the most part taken by a low brushwood; grass is not plentiful, and the higher ridges maintain a growth of alpine plants only so long as patches of snow continue to lie. The rock walls harbor some rock plants, but many absolutely barren wildernesses of stone occur. Between an elevation of 4,200 and 6,200 feet is the region of the two most interesting forest-trees of Lebanon, the cypress and the cedar. The former still grows thickly, especially in the valley of the Kadísha; the horizontal is the prevailing variety. In the upper Kadísha valley there is a cedar grove of about three hundred trees, among which five are of gigantic size; it is alleged that other specimens occur elsewhere in Lebanon. The *Cedrus Libani* is intermediate between the *Cedrus Deodara* and the *C. atlantic* (see CEDAR). The cypress and cedar zone exhibits a variety of other leaf-bearing and coniferous trees; of the first may be mentioned several oaks—*Quercus Mellul*, *Q. subalpina* (Kotschy), *Q. Cerris*, and the hop-hornbeam (*Ostrya*); of the second class the rare Cilician silver fir (*Abies cilicica*) may be noticed. Next come the junipers, sometimes attaining the size of trees (*Juniperus excelsa*, *J. rufescens*, and, with fruit as large as plums, *J. drupacea*). But the chief ornament of Lebanon is the *Rhododendron ponticum*, with its brilliant purple flower clusters; a peculiar evergreen, *Vinca libanotica*, also adds beauty to this zone.

There is nothing of special interest about the fauna of Lebanon. Bears are no longer numerous; the panther and the ounce are met with; the wild hog, hyena, wolf, and fox are by no means rare; jackals and gazelles are very common. The polecat and hedgehog also occur. As a rule there are not many birds, but the eagle and the vulture may occasionally be seen; of eatable kinds partridges and wild pigeons are the most abundant. In some places the bat occasionally multiplies so as to become a plague. The district to the west of Lebanon slopes in an intricate series of plateaus and terraces to the Mediterranean. The coast is for the most part abrupt and rocky, often leaving room for only a narrow path along the shore, and when viewed from the sea it does not lead one to have the least suspicion of the extent of the country lying between its cliffs and the lofty summits behind. Most of the mountain spurs run from east to west, but in northern Lebanon the prevailing direction of the valleys is northwesterly, and in the south some ridges also run parallel with the principal chain. The valleys have for the most part been deeply excavated by the rapid mountain streams which traverse them; the apparently inaccessible heights are crowned by numerous villages, castles, or cloisters embosomed among trees. The names and the elevations of the several peaks, which even in summer are covered with snow, have been variously given by different explorers; according to the most accurate accounts the "Cedar block" consists of a double line of four and three summits respectively, ranged from north to south, with a deviation of about 35°. The height of Zahr el-Kazib, by barometric measurement, is 10,018 feet; that of the others is almost the same. South from them is the pass (8,351 feet) which leads from Baalbec to Tripoli; the great mountain amphitheater on the west side of its summit is remarkable. Further to the south is a second group of lofty summits—the snow-capped Sunnìn, visible from Beyrout; its height is 8,554 feet, or, according to other accounts, 8,895 feet.

The Antilibanus chain has in many respects been much less fully explored than that of Lebanon. Apart from its southern offshoots it is sixty-seven miles long, while its width varies from sixteen to thirteen and a half miles. It rises from the plain of Hasya-Homs, and in its northern portion is very arid and barren.

The Maronites are the principal element of the Lebanon population. (For the DRUSES, see that heading.) The Metáwile, who enjoy no good reputation, are Shi'ite Mohammedans; their sheikh resides at Jeba'a in South Lebanon. Of late years Protestantism, through the agency of the American mission at Beyrout, has begun to take some hold of the population, and is daily gaining ground. The Catholic missions also, with Beyrout for their center, are meeting with some success, and the Western schools are indisputably affecting the culture and manners of the country. The present comparative security of life and property are highly favorable to its development. Since the violent outbreak of 1860, the bloody contests between the Maronites and Druses have not been renewed, although the mutual hatred still continues. The number of Maronite monks in the mountain district is said to reach eight thousand. The monasteries possess a large portion of the best land, which is cultivated by the monks themselves, and is quite exempt from all public burdens.

The Lebanon mountaineers are a fine, vigorous set of men. In what relates to dress they show a preference for gay colors. Tattooing is universal in both sexes. Their diligence is worthy of all praise. In the upper regions cattle-breeding is the chief occupation; the numerous flocks of sheep and goats are the great obstacle to forestry in these parts. No care is taken to protect the woods. For practical utility the trees which are planted (besides various fruit-trees, especially figs) are the white poplar (for building purposes), the walnut, the olive, and above all the mulberry—silk culture being an important industry with the mountain population, and still remunerative notwithstanding the occasional fall of prices. Population of province (1900), 399,500.

LEBANON, a manufacturing "borough" of the United States, capital of Lebanon county, Penn., is situated on the Union Canal, twenty-four miles east of Harrisburg by the Lebanon Valley branch of the Philadelphia and Reading Railway. It is substantially built in brick and stone, and is steadily increasing in importance. Its principal industrial establishments are blast-furnaces, rolling-mills, car-works, planing-mills, foundries, and manufactories of organs, paper, cigars, carriages, and agricultural implements. About seven miles distant are the Cornwall Ore Banks, three eminences—Grassy, Middle and Big Hill—consisting almost entirely of iron-ore veined with copper. The town was laid out in 1750, and incorporated as a borough in 1813; gas was introduced in 1857, and in 1872 water was brought into the place by gravitation at an expense of $250,000. The population of Lebanon is now increased from 14,664 in 1890 to 17,628 in 1900.

LEBDA. See LEPTIS.

LE BEAU, CHARLES (1701–1778), a French historical writer, was born at Paris. In 1748 he was admitted a member of the Academy of Inscriptions, and in 1752 he was nominated professor of eloquence in the Collége de France. From 1754 he held the office of perpetual secretary to the Academy of Inscriptions, in which capacity he edited fifteen volumes (from the 25th to the 39th inclusive) of the *Histoire* of that institution. He died at Paris on March 13, 1778.

LEBEDIN, a district town of the Kharkoff government in European Russia 102 miles northwest of the government town, near the Olshana and Buravka, two small tributaries of the Dnieper. Its population has increased from 15,137 in 1863 to 20,000. There are four annual fairs, and a good trade in grain and cattle.

LEBEDYAN, a district town of Tamboff government in European Russia, situated 132 miles west of Tamboff, on the bluffs of the right bank of the Don. Population, 7,000.

LEBRIJA, or LEBRIXA, a town of Spain, in the province of Seville, forty-four miles by rail from Seville, which lies north by east, and about fifty miles from Cadiz. The population is 12,864.

LE BRUN, CHARLES, French painter, was born at Paris, February 24, 1619, and attracted the notice of Chancellor Séguier, who placed him at the age of eleven in the studio of Vouet. At fifteen he received commissions from Cardinal Richelieu in the execution of which he displayed an ability which obtained the generous commendations of Poussin himself, in whose company Le Brun started for Rome in 1862. In Rome he remained four years in the receipt of a pension due to the liberality of the chancellor. On his return to Paris Le Brun found numerous patrons, of whom the celebrated Superintendent Fouquet was the most important. Colbert also promptly recognized Le Brun's powers of organization, and attached him to his interest. Together they founded the Academy of Painting and Sculpture (1648), and the Academy of France at Rome (1666), and gave a new development to the industrial arts. In 1660 they established the Gobelins, which at first was a great school for the manufacture, not of tapestries only, but of every class of furniture required in the royal palaces. The nature of his talent was in harmony with the taste of the king, who, full of admiration at the decorations designed by Le Brun for his triumphal entry into Paris (1660), commissioned him to execute a series of subjects from the history of Alexander. The first of these, Alexander and the Family of Darius, so delighted Louis XIV. that he at once ennobled Le Brun (December, 1662), who was also created first painter to his majesty with a pension of 12,000 livres, the same amount as he had yearly received in the service of the magnificent Fouquet. From this date all that was done in the royal palaces was directed by Le Brun. At the death of Colbert, Louvois, who succeeded him in the department of public works, showed no favor to Le Brun, and in spite of the king's continued support he felt a bitter change in his position. This contributed to the illness which on February 22, 1690, ended in his death in the Gobelins.

LECCE, one of the most important cities of southern Italy, and the administrative center of the province of Lecce (formerly Terra d'Otranto), is situated on the railway between Brindisi and Otranto, about eight miles from the coast of the Adriatic. The population (1901) was 32,485.

LECCO, a city of Italy, in the province of Como, situated near the southern extremity of the eastern branch of the lake of Como, which is frequently distinguished as the lake of Lecco. It is the meeting place of several important roads, and the terminus of a railway from Bergamo, which joins the line from Milan. Population, 7,000.

LE CLERC, JEAN, or CLERICUS, theologian and a man of letters, was born in 1657 at Geneva, where his father Stephen Le Clerc was professor of Greek, and died in 1736.

LECTION, LECTIONARY, LECTOR. The Jewish custom of reading the books of Moses in the synagogues every Sabbath day was already ancient in the apostolic age, and we learn from Luke iv. 16, 17, that portions were also read from the prophets, though the system of prophetic lessons at least had not yet reached the fixity of the later ritual. For obvious reasons the reading of Scripture at public worship was continued by the Christian Church with certain modifications. Traces of the office of reader as distinct from that of deacon begin to appear in Tertullian, who makes frequent allusions to the public reading of both Old and New Testament Scriptures, but says nothing that can be construed as implying anything like a fixed table of lessons. Toward the end of the fourth century, however, indications of a widely spread custom of reading the Scriptures according to a uniform and rigid scheme became frequent; and the practice even then was spoken of as ancient. The order of (continuous) lessons for the five ordinary week days cannot be traced with certainty further back than to the tenth century, but those for the Sundays, also for the most part continuous, can be traced, so far as the gospels at least are concerned, to the eighth, and large coincidences with the Armenian lectionary lead to the inference that much had been already fixed before 595.

LEDA. See CASTOR AND POLLUX.

LEDRU-ROLLIN, ALEXANDRE AUGUSTE, was born in the house of Scarron at Fontenay-aux-Roses, on February 2, 1807, was educated at Paris, and had just been entered at the Paris bar, when the revolution of July, 1830, broke out. He soon made himself a great name as an advocate, and was engaged on the republican side in all the great political trials of the next ten years. He also wrote many political tracts, and edited more than one republican newspaper, so that when he was elected as deputy for Le Mans in 1841 he was expected to take up an advanced republican position in the chamber. From this time to the outbreak of the revolution of February, 1848, he was regarded as the chosen leader of the working men of France, and spoke and wrote in favor of liberty of labor and universal suffrage. It was in the speeches of himself and his friends Lamartine and Louis Blanc at Lille, Dijon, and Chalons at working men's banquets during the latter months of 1847 that the revolution of 1848 was most clearly foreshadowed and prepared. When it did actually break out, it was Ledru-Rollin who overthrew the project of making the duchess of Orleans regent, and obtained the nomination of a provisional government. In this provisional government he was clearly pointed out by his influence among the working men for the ministry of the interior. When he resigned on June 24, 1848, he found that his four months of office had lost him his old leadership, as the conscientious performance of such an office inevitably would, but he had the credit of having for the first time established a working system of universal suffrage. He tried to regain his old influence, but in vain, and at the election of president in December had but 370,000 votes. The earlier months of 1849 he spent in protesting against the policy, especially the Roman policy, of the president Louis Napoleon Bonaparte and his ministry, which culminated in his moving their impeachment. His motion being defeated on June 12th by 289 to 8, he on June 13th headed what he called a peaceful demonstration, and his enemies an appeal to arms, which was soon dispersed. Ledru-Rollin himself escaped to London, where he signed the manifestoes of the revolutionary committee of Europe with Kossuth, Mazzini, Rüge, and sometimes Desatz. He also employed his leisure in writing a work on the *Décadence d'Angleterre*, in which he attempted to deduce the necessary fall of England from its aristocratic form of government and the misery of the lower classes. In 1870 he returned to Paris, but though elected in three departments he refused to sit in the national assembly of 1871. In 1874 he consented to sit for the department of Var, and spoke at length on June 3d on an electoral scheme, upholding the one great aim and achievement of his life, universal suffrage. The effort was too much for his health; he steadily grew weaker and weaker, and died on December 31, 1874.

LEDYARD, JOHN, traveler, was born in Groton, Conn., in 1751. After vainly attempting to settle down to the study of law and theology, Ledyard adopted the life of a seaman, and, finding his way to London, was engaged, in 1776, as a corporal of marines by Captain Cook, for his third voyage of discovery. On his return in 1778. Ledyard had to give up to the Admiralty the copious notes he had kept, but was, nevertheless, able to publish a somewhat meager narrative of his experiences (Hartford, Conn., 1783). He continued in the British service till 1782, when, his ship being off Long Island, he managed to escape. Ledyard returned to Europe again in 1784, his purpose being to obtain the means of fitting out an expedition to the northwest coast of America. Having failed in his attempts, he decided to reach his goal by traveling across Europe and Asia. On his arrival in Stockholm (1786) he attempted to cross to Abo, in Finland, on the ice; but, meeting with open water, he turned back, walked all the way round the head of the gulf, down through Finland, and on to St. Petersburgh, where he arrived in March, 1787, without shoes or stockings, and penniless. He made friends, however (among others Pallas), and got permission from the government to accompany Doctor Brown, a Scotch physician in the Russian service, to Siberia. Ledyard left Doctor Brown at Barnaul, went on to Tomsk and Irkutsk, then visited Lake Baikal, and, reaching the Lena, sailed down to Yakutsk, where he arrived on September 18th. With a Captain Billings he returned to Irkutsk, where, on February 14, 1788, he was suddenly arrested, hurried across Siberia and Europe to the frontier of Poland, and ordered not to return under pain of death. On reaching London, Ledyard was befriended by Sir Joseph Banks, who engaged him on behalf of the African Association to carry on their work of exploration in Africa. His career was, however, cut short at Cairo, where he died on January 17, 1789. Ledyard was a born explorer, and, had he fallen into good hands in good time, and his energies been properly directed, would probably have done good work.

LEE, NATHANIEL (*c.* 1650-1692), dramatist, was the son of Doctor Lee, incumbent of Hatfield, Hertfordshire, England. He studied at Westminster School and Trinity College, Cambridge. After essaying the profession of an actor with very slight success, he wrote several tragedies, the best known of which are *The Rival Queens*, 1677, and *Theodosius*, 1680. He also assisted Dryden in producing *Œdipus* and *The Duke of Guise*. From 1684 to 1788 he was an inmate of Bedlam, and afterward until his death he was subject to intermittent attacks of insanity.

LEE, RICHARD HENRY, an American statesman and orator, born in Westmoreland county, Va., January 20, 1732, was one of the six distinguished sons of Thomas Lee, a descendant of an old Cavalier family. After obtaining the foundation of a liberal education in England, and spending a little time in travel, he returned to Virginia in 1752, coming into possession of a fine property left him by his father, and for several years applied himself to varied studies. At the age of twenty-five he was appointed justice of the peace, and soon after was chosen a delegate to the house of burgesses. He kept a diffident silence during two sessions, his first speech being in strong opposition to slavery, which he proposed to discourage, and eventually to abolish, by imposing a heavy tax on all further importations. In 1764 Lee had applied for a collectorship under the Stamp Act, which afterward roused the determined hostility of the colonies. But on reflection he regretted doing so, and became an outspoken promoter of democratic ideas. In February, 1766, he organized an association in Westmoreland, in accordance with Patrick Henry's famous resolution against the Act. At the winter session of the burgesses in 1766, Lee, with the aid of Patrick Henry, succeeded in carrying the house upon a test question against the united aristocratic elements of the colony. In 1767 he spoke eloquently against the acts levying duties upon tea and other articles. Lee is also said to have originated, in a conversation with fellow burgesses in 1773, the plan of an inter-colonial or so-called continental congress, which was carried into effect next year. At this first congress in Philadelphia in 1774, Lee is said to have penned the address to the king, and is known to have prepared that to the people of British America, together with the second address to the people of Great Britain, directed by congress in 1775, both of which are among the most effective papers of the time. On June 7, 1776, instructed by the Virginia house of burgesses, he introduced in congress the resolutions declaring "that these united colonies are, and of right ought to be, free and independent states, that they are absolved from all allegiance to the British crown, and that all political connection between them and the state of Great Britian is, and ought to be, totally dissolved." (See INDEPENDENCE, DECLARATION OF, *ante*). Lee was in congress in 1778-80 and 1784-85, and was one of the first senators chosen from Virginia after the adoption of the federal constitution. Though strongly opposed to the adoption of that constitution, owing to what he regarded as its dangerous infringements upon the independent power of the States, he accepted the place of senator in hope of bringing about amendments. He became a warm upholder of Washington's administration, and his prejudices against the constitution were largely removed by its working in practice. He retired from public life in 1792, and died at Chantilly, Westmoreland county, Va., June 19, 1794.

LEECH. The medicinal leech (*Hirudo medicinalis*, L.) is a species grouped under the family *Gnathobdellidæ* (with a dental apparatus composed of armed muscular ridges) of the discophorous *Annelida*. The body of a leech is spindle-shaped, and flattened dorsally and ventrally so as to be elliptical in transverse section It is somewhat pointed in front except when the mouth is in action, while posteriorly it is terminated by a disk or sucker. The surface is marked by a series of annulations reaching from ninety-five to one hundred, but such are only cutaneous, as indicated by the ganglia, the segmental organs; the white spots on each side, and even by the arrangement of the two outer yellowish stripes, for the primary segments of the body comprise from three to five of these. The anterior sucker is composed of four incomplete annuli and another surrounding the mouth, while the posterior has seven. The color of the dorsum is generally dull olive or olive-brown, with six yellowish, rusty, or greenish-yellow bands more or less interrupted with black, the spots of the latter being somewhat symmetrically arranged in the two outer rows. The ventral surface is speckled with black spots on a grayish ground. Several varieties occur, according as the dorsum is lighter or darker brownish or olive, and the ventral surface with or without spots.

There is no special body-cavity, the blood-vessels and connective tissue alone occurring between the muscles and the digestive chamber.

The mouth opens into the pharynx, the structure of which, as in other *Gnathobdellidæ*, differs essentially from that of the *Rhynchobdellidæ*. Digestion seems to be slow in leeches, and breeders feed them with blood only once in six months. It is well to remember that the alimentary canal contains blood in those brought direct from their native marshes.

The leech is hermaphrodite, but congress of different individuals is necessary for reproduction, and thereafter spermatophores, which have a special covering, are found in the respective vaginæ. There is little difficulty in rearing leeches in confinement if a proper method is followed, and accordingly various leech tanks and ponds have been constructed. One of the largest schemes of the kind is a leech farm of thirteen acres near Newton, Long Island. The breeding ponds are in oblongs, each of one and one-half acres in extent, and three feet or more in depth. The bottom is composed of clay, and the margins of peat. The cocoons are deposited in the soft peat from June onward, the chief enemies being musk-rats, water-rats, and water-shrews, which dig the cocoons out of the peat. The adult leeches are fed every six months on fresh blood placed in linen bags suspended in the water. It is also the opinion of some that leeches which have been filled with blood make good breeders.

The leech is the Bdella of Herodotus, Theocritus, Nicander, and other Greek authors, and the *Hirudo* and *Sanguisuga* of Plautus, Cicero, Horace, Pliny, and other Roman writers. Cælius Aurelianus mentions its use, and Galen and his successors recommend its application. Appian also alludes to the leech, and describes very graphically the process by which it fills itself with blood. It was sufficiently familiar to naturalists both before and after the time of Linnæus, though occasionally there has been considerable ambiguity in regard to species. The use of the leech is mainly for local blood-letting, but in modern times the practice has greatly diminished; indeed, in some cities the druggists chiefly use them with doubtful efficiency in cases of incipient gumboil and in facial ecchymosis. They may be applied to any part of the adult skin, and to the mouth, fauces, and other available inlets by the aid of a leech-glass, which consists of a tube with a slightly contracted aperture, and provided (or not) with a glass piston to push the leech onward. In China a piece of bamboo serves the same purpose. For such functions the most active specimens should be chosen and kept for an hour out of water, and then applied to a perfectly clean surface of skin. They may also be made to bite by smearing the skin with cream or blood, or by immersing the leech for a minute in tepid water. Each fills in about fifteen minutes, and draws from forty to eighty-five grains of blood, or, including that afterward obtained by fomenting the wound, about half an ounce. In young children they should never be placed on parts where firm pressure cannot be applied.

LEECH, John, the most genial of the humorous draftsmen of our century, was born in London on August 29, 1817. It was from his father that Leech inherited his skill with the pencil, which he began to use at a very early age. When he was only three, he was discovered by Flaxman, who had called on his parents, seated on his mother's knee, drawing with much gravity. The sculptor pronounced his sketch to be wonderful, adding, "Do not let him be cramped with lessons in drawing; let his genius follow its own bent; he will astonish the world"—an advice which was strictly followed. Leech was educated at Charterhouse, where Thackeray, his lifelong friend, was his schoolfellow, and at the age of sixteen he began to study for the medical profession. He was eighteen when his first designs were published, a quarto of four pages, entitled *Etchings and Sketches by A. Pen, Esq.*, comic character studies from the London streets. Then he drew some political lithographs, did rough sketches for *Bell's Life*, produced an exceedingly popular parody on Mulready's postal envelope, and, on the death of Seymour, applied unsuccessfully to illustrate the *Pickwick Papers.* In 1840 Leech began his contributions to the magazines with a series of etchings in *Bentley's Miscellany*, where Cruikshank had published his splendid plates to *Jack Sheppard* and *Oliver Twist*, and was illustrating *Guy Fawkes* in sadly feebler fashion. In company with the elder master Leech designed for the *Ingoldsby Legends* and *Stanley Thorne*, and till 1847 produced many independent series of etchings. In 1845 Leech illustrated St. Giles and St. James in Douglas Jerrold's newly started *Shilling Magazine*, with plates more vigorous and accomplished than those in *Bentley*, but it is in subjects of a somewhat later date, and especially in those lightly etched and meant to be printed with color, that we see the artist's best powers with the needle and the acid. Among such of his designs are four charming plates to Dickens' *Christmas Carol*, 1844, the broadly humorous etchings in the *Comic History of England*, 1847–48, and the still finer illustrations to the *Comic History of Rome.* 1852.

But it was in work for the wood-engravers that Leech was most prolific and individual. Among the earlier of such designs are the illustrations to the *Comic English* and *Latin Grammars*, 1840, to *Written Caricatures*, 1841, to Hood's *Comic Annual*, 1842, and to Albert Smith's *Wassail Bowl*, 1843, subjects mainly of a small vignette size, transcribed with the best skill of such woodcutters as Orrin Smith, and not, like the larger and later *Punch* illustrations, cut at speed by several engravers working at once on a subdivided block. It was in 1841 that Leech's connection with *Punch* began, a connection which subsisted till his death on October 29, 1864, and resulted in the production of the best known and most admirable of his designs.

LEEDS, a town of England, in the West Riding of Yorkshire, the metropolis of the woolen manufacture, and in point of population only exceeded by London, Liverpool, Manchester, and Birmingham. Leeds is situated nearly in the center of the West Riding, in the wapentake of Skyrack, and in the pleasant and well cultivated valley of the river Aire. The surrounding country possesses much cheerful beauty; and the view from Woodhouse Moor, one of the most elevated parts of the borough, is not excelled in any part of the Riding. For manufacturing and commercial purposes, the situation of Leeds is highly advantageous. It is distant from London by the Great Northern Railway 185 miles, from Edinburgh 225, from Liverpool 74, from Manchester 42½, and from Birmingham 113, and may be said to occupy a central position in the railway system of England. It has also communication with Liverpool by the Leeds and Liverpool Canal, and with Hull by the Aire and Calder navigation, and through these means of transit has the highest facility for the transmission to the principal seaports of England of its various manufactures, and for receiving raw material at the lowest rate of carriage. It is, moreover, the center of an extensive coal and iron district. All the advantages for the successful working of machinery are therefore within its reach, and hence it has become the seat of several important industries, especially the woolen and linen manufactures, iron-working and machine-making.

Cloth is the staple trade of the town, although the manufacture itself is not the leading one within the borough, being carried on, to a large extent, in townships out of the parish and borough of Leeds. In the town, however, the trade centers, and there the cloth is finally prepared for the market by what is technically termed finishing or dressing—a department quite distinct in Leeds from that of the manufacturer. It is probable that the iron trade in its different branches, including the casting of metal, and the manufacture of steam-engines, of steam-plows, of machinery of every kind, and of mechanical tools, now gives employment to a larger number of persons within the borough of Leeds than any other branch of industry. Leeds was at one time famed for the production of artistic pottery, and very fine specimens of old Leeds ware are still occasionally to be discovered among the residences of the poor in the town. This branch of manufacture, however, became extinct about eighty years ago. In addition to these particular branches of industry, the manufacture of ready-made clothing has become one of great importance. The leather trade is also one of great importance in the borough, many large tanning establishments being erected on the outskirts, while the wholesale manufacture of boots and shoes for army and other purposes is carried on in workshops which are the largest of their kind in the United Kingdom.

The external appearance of the town has been greatly improved within the last twenty years. The event which had the greatest influence in promoting the erection of more handsome buildings than those of which Leeds was formerly constituted was the opening of the town-hall by the Queen in the year 1858. This is a noble building in the Grecian style. It is 250 feet long and 200 feet broad, and is crowned by a tower 225 feet high. The building, which cost, including the site and fittings, more than £130,000, is adorned with statues and portraits of local celebrities. The other public buildings of importance in the town are the royal exchange, in Perpendicular Gothic, the foundation of which was laid in 1872, the corn exchange, a fine oval edifice, and the bank of Messrs. Beckett & Co., one of the best works of Sir Gilbert Scott.

Leeds has long been distinguished for the activity of its political and public life. It has taken a leading part in many of the great questions which have agitated the country during the present century, and among its successive representatives in parliament have been Lord Macaulay, Sir William Molesworth, Mr. Marshall, three members of the Baines family, and other men whose names are familiar in the annals of the Liberal party, to which upon the whole the borough has given a consistent support since its enfranchisement in 1832. The area of the municipal and parliamentary borough is 21,572 acres. In addition to the township of Leeds some ten out-townships are included in this area. The population (207,165 in 1861 and 259,212 in 1871) in 1881 was 309,126, and in 1901 was 428,953.

LEEK, the *Allium Porrum* of botanists, a plant which is now considered as a mere variety of *Allium Ampeloprasum* produced by cultivation. The plant is probably of Eastern origin, since it was commonly cultivated in Egypt in the time of the Pharaohs, and is so to the present day. The Romans, it would appear, made great use of the leek for savoring their dishes, as seems proved by the number of recipes for its use referred to by Celsius. Hence it is more than probable that it was brought to England by the Romans during the period of their occupation. Italy was celebrated for leeks in the time of Pliny, according to whom they were brought into great notice and esteem through the emperor Nero, derisively surnamed "Porrophagus," who used to eat them for several days in every month to clear his voice. The leek is very generally cultivated in Great Britain as an esculent, but more especially in Scotland and in Wales, being esteemed as an excellent and wholesome vegetable, with properties very similar to those of the onion, but of a milder character. In America it is not much cultivated except by market gardeners in the neighborhood of large cities. The whole plant, with the exception of the fibrous roots, is used in soups and stews. The leek is the national symbol or badge of the Welsh, who wear it in their hats on St. David's Day.

LEEK, a market town of Staffordshire, England, is situated on a fine eminence above the river Churnet, and on the Churnet Valley branch of the North Staffordshire railway, twenty-four miles east-northeast of Stafford. Population, 14,000.

LEER, a seaport and the chief town of a circle in the province of Hanover, Prussia, lies on the right bank of the Leda, near its confluence with the Ems, sixteen and one-half miles south of Aurich. The population is 10,074.

LEEUWARDEN, or LEUWARDEN, a town of Holland, at the head of the province of Friesland, seventeen miles inland from Harlingen and thirty-two west of Groningen. It is one of the most prosperous of the secondary towns in the country, and, thanks in great measure to the opening of the railway to Harlingen (1863) and Groningen (1866), full of life and enterprise. To the name of the Frisian Hague it is entitled as well by similarity of history as by similarity of appearance. As the Hague grew up round the court of the counts of Holland, so Leeuwarden round the court of Frisian stadtholders; and, like the Hague, it is an exceptionally clean, tasteful, and attractive town, with parks, pleasure grounds, and drives. The population of the town in 1869 was 24,862; that of the commune increased from 15,686 in 1714 to 33,009 in 1901 (5,217 Roman Catholics, 1,124 Jews).

LEEUWENHOEK, or LEUWENHOEK, ANTHONY VAN, a microscopist of remarkable scientific ability, was born at Delft, in Holland, in 1632. He does not seem to have had the advantage of a liberal education, but was probably brought up as a glass-grinder, early acquiring a reputation for the excellent lenses with which he furnished the microscopists who were then turning their attention to the minute structure of organized bodies. He appears soon to have found that single lenses of very short focus were preferable for this purpose to the compound microscopes then in use; and it is clear from the discoveries he made with these that they must have been of very excellent quality. These discoveries were for the most part originally given to the world in the *Philosophical Transactions* of the Royal Society, to the notice of which learned body he was first introduced by De Graaf in 1673. He was elected a fellow in 1680, and was chosen in 1697 a corresponding member of the Academy of Sciences in Paris. He died at his native place in 1723.

His capital discovery was undoubtedly that of the capillary circulation of the blood, first announced in 1690, which afforded the link still wanting for the completion of the doctrine of Harvey, by showing that the blood passes from the arteries into the veins through a network of extremely minute vessels, the thin walls of which allow the fluid plasma to transude into the tissues it traverses, so as to serve for their nutrition.

LEEWARD ISLANDS. See WEST INDIES.

LEFÈVRE D'ÉTAPLES. See FABER, JACOBUS.

LEGATE, one of the special names of a messenger or ambassador of the pope. The first four centuries present us with no actual recorded instances of recognized delegation of the papal authority; for that Hosius acted as papal legate at the council of Nice is nothing more than an assertion of Gelasius of Cyzicus who wrote about the end of the fifth century, and no western prelate took any part, either personally or otherwise, in the first council of Constantinople. The fifth (sometimes called the seventh) canon of the council of Sardica, in 343, however, shows that the possibility of such delegation had already begun to be discussed, and suggests that it may actually have been exemplified before that date. This canon provides that, in case of an appeal by a deposed bishop to Rome, if the pope is inclined to grant a new trial, it shall be competent for him to write to the bishops of the neighboring province, but if the appellant wishes the pope to send priests from his own side, it shall be free to the pope to do so, and give them due rank and dignity in the court thus constituted.

Instances of delegation of the papal authority in various degrees become numerous in the course of the fifth century, especially during the pontificate of Leo I. In 449 Leo was represented at the "Robber Synod," from which his legates hardly escaped with life; at Chalcedon, in 451, they were treated with singular honor. Passing on to the time of Gregory the Great, we find Augustine, of Canterbury, sometimes spoken of as legate, but it does not appear that in his case this title was used in any strictly technical sense, although the archbishop of Canterbury afterward attained the permanent dignity of a *legatus natus*. Boniface, the apostle of Germany, was in like manner constituted, according to Hincmar, a legate of the apostolic see by Popes Gregory II. and Gregory III. The policy of Gregory VII. naturally led to a great development of the legatine as distinguished from the ordinary episcopal function. The *nuncius apostolicus* (who has the privilege of red apparel, a white horse, and golden spurs) possesses ordinary jurisdiction within the province to which he has been sent, but his powers otherwise are restricted by the terms of his mandate. The *legatus a latere* (almost invariably a cardinal, though the power can be conferred on other prelates) is, in the fullest sense, the plenipotentiary representative of the pope. He has the power of suspending all the bishops in his province, and no judicial cases are reserved from his judgment. Without special mandate, however, he cannot depose bishops or unite or separate bishoprics. At present *legati a latere* are not sent by the holy see, but diplomatic relations, where they exist, are maintained by means of nuncios, internuncios, and other agents. According to the congress of Vienna, the diplomatic rank of a papal nuncio corresponds to that of an ambassador. The pope at present has nuncios at the courts of Bavaria, Austria-Hungary, Belgium, Chili, Spain, France, and Portugal. Inferior in rank and less numerous are the internuncios (Holland, Brazil).

LEGENDRE, Adrien Marie, French mathematician, a contemporary of Laplace and Lagrange, with whom he deserves to be ranked, was born at Paris (or, according to some accounts, at Toulouse) in 1752. He was brought up at Paris, where he completed his studies at the Collége Nazarin. Soon afterward he was appointed professor of mathematics in the École Militaire at Paris, and he was afterward professor in the École Normale. In 1782 he received the prize from the Berlin Academy for his *Dissertation sur la Question de Balistique*, a memoir relating to the paths of projectiles in resisting media. He also, about this time, wrote his *Recherches sur la Figure des Planètes*, published in the *Mémoires* of the French Academy, of which he was elected a member in succession to D'Alembert in 1783. He was also appointed a commissioner for connecting geodetically Paris and Greenwich, his colleagues being Méchain and Cassini; General Roy conducted the operations on behalf of England. During the Revolution, when the decimal system had been decreed, he was one of the three members of the council established to introduce the new system, and he was also a member of the commission appointed to determine the length of the meter, for which purpose the calculations, etc., connected with the arc of the meridian from Barcelona to Dunkirk were revised. He was also associated with Prony in the formation of the great French tables of logarithms of numbers, sines, and tangents, and natural sines, called the *Tables du Cadastre*, in which the quadrant was divided centesimally; these tables have never been published (see LOGARITHMS). He also served on other public commissions. He was examiner in the École Polytechnique, but held few important state offices, and he seems never to have been much noticed by the different governments; it has indeed been generally remarked that the offices he held were not such as his reputation entitled him to. He died at Paris on January 10, 1833, in his eighty-first year, and the discourse at his grave was pronounced by Poisson. He was engaged in mathematical investigations almost up to the time of his death. The last of the three supplements to his *Traité des Fonctions Elliptiques* was published in 1832. Legendre was the author of separate works on elliptic functions, the integral calculus, the theory of numbers, and the elements of geometry, besides numerous papers which were published chiefly in the *Mémoires* of the French Academy.

LEGERDEMAIN, Prestidigitation, or Sleight of Hand, as it is variously called, is the art of deceiving the eye of the spectator by adroit movements of the hand of the operator so as apparently to cause an object either to be changed, produced, or made to disappear. The term "legerdemain" is extended in meaning to include all sorts of "conjuring" by means of mechanical and other contrivances, although it properly applies to tricks performed with the hand alone. Even in ancient times two distinct branches of magic existed—the impostures of divination and necromancy, and the amusing exhibition of jugglery and sleight of hand. Judging from the accounts which history has handed down to us, the marvels performed by the thaumaturgists of antiquity were very skillfully produced, and must have required a considerable practical knowledge of the art. The Romans were in the habit of giving conjuring exhibitions, the most favorite feat being that of the "cups and balls," the performers of which were called *acetabularii*, and the cups themselves *acetabula*. The balls used, however, instead of being the convenient light cork ones employed by modern conjurors, were simply round white pebbles, which must have added greatly to the difficulty of performing the trick The art survived the barbarism and ignorance of the Middle Ages; and the earliest professors of the modern school were Italians such as Jonas, Androletti, and Antonio Carlotti. In England legerdemain has always found professors and patrons. But there is no reason for supposing that the ancient magicians were more proficient in the art than their modern successors; and, as Robert Houdin, the greatest of modern conjurors, has pithily observed, "if antiquity was the cradle of magic, it is because the art was yet in its infancy." Toward the close of the reign of Elizabeth the profession had fallen very low in England, and the performers were classed with "ruffians, blasphemers, thieves, vagabonds, Jews, Turks, heretics, pagans, and sorcerers." In 1840 a German physicist named Döbler devised an entertainment which gave an entirely new development to the science, and was in effect the same as the conjuring entertainments which have since become so popular and familiar. The most eminent conjurors of the modern school have been Robert Houdin, Wiljalba Frikell, Herrmann, and Buatier de Kolta.

Robert Houdin may be considered the actual founder of the modern school of legerdemain. This celebrated conjuror, who was originally a watchmaker and mechanician, possessed a remarkably inventive genius, and, having early turned his attention to legerdemain, he concentrated all his efforts upon the development and improvement of that art. Discarding the clumsy tricks of what he calls the "false-bottomed school," as well as the gaudy paraphernalia with which his predecessors used to encumber their stage, he produced, in 1845, at a little theater in the Palais Royal, a number of entirely new illusions, in which all the resources of mechanical and electrical science were combined with manual dexterity and personal address. His entertainments, which he called *Soirées Fantastiques*, made a great sensation in Paris, and placed him at once at the head of his profession. His skill and success were so great that the French Government sent him on a sort of roving commission to Algeria, in order that he might, by his exhibitions of natural magic, destroy the prestige of the *marabouts*—wonder-workers who had obtained a great and dangerous influence over the Arabs by their pretended miracles. The motto prefixed by Robert Houdin to his chapter on the "Art of Conjuring" is—"to succeed as a conjuror, three things are essential: first, dexterity; second, dexterity; and third, dexterity;" and this is not a mere trick of language, for triple dexterity is required, not only to train the hand to the needful adroitness, but to acquire the requisite command of eye and tongue.

Besides the legitimate application of legerdemain to the purpose of amusement, it serves another and less innocent purpose, being employed by card sharpers in their nefarious profession. The successful card-sharper must have qualities which, if applied in a legitimate direction, would insure distinction in almost any profession. He must be observant, dexterous, cool; but above all he must have impudence.

LEGHORN (Italian *Livorno*), a city of Italy, the chief town of the province of Leghorn (which includes the island of Elba), the see of a bishop, and, next to Genoa and Naples, the greatest commercial port in the kingdom, is situated on the coast of the Ligurian Sea fifteen miles southwest of Pisa, with which it is connected by a branch from the main west coast line. It is built on low-lying ground backed by a ridge of hills, of which the most striking, though not the highest, is Monte Nero, with its ancient monastery. In some respects one of the least Italian of Italian cities, Leghorn owes its prosperity as a port, not so much to any special advantages of situation, as to wise legislation and labor. Broad and well-kept streets, spacious squares, and large, substantial houses are the general characteristics of the city, which has room enough within the circuit of its walls (built 1835–37), though it has scattered its villas on the neighboring hills and coast. Of note among the buildings are the old cathedral, the town hall, the great oil warehouses erected by Cosmo III. in 1705, the reservoir (a subterranean structure dating from the time of Ferdinand III.), and the Jewish synagogue, which ranks next to that of Amsterdam. Near the port stands the statue of Ferdinand I. by Giovanni dell' Opera, with four slaves in bronze, by Pietro Tacca, chained to the pedestal; and the Piazza Carlo Alberto is adorned with statues of the grand dukes Ferdinand III. and Leopold II. The old English cemetery (closed 1839), which was up to the present century the only Protestant burial-place in Italy, contains the tombs of Smollett and Francis Horner. The Torre del Marzocco, or "Tower of the Sculptured Lion," is one of the leading landmarks of the city from the sea, and almost the only relic of the republican period. Among the public institutions are the "Chambers of Public Payments," similar to the London clearing-house, a large naval academy opened in 1881, a chamber of commerce dating from 1801, a public library of 40,000 volumes, and a technical and nautical institute. Great changes have been effected in the port of Leghorn since the middle of the century. The "new port" is formed by a breakwater, finished in 1863, which extends north and south for 3,300 feet, at a distance of six furlongs from the shore. It has a general depth of from twenty-four to thirty-two feet. Vessels moored to the breakwater are sheltered from all winds, but those in the open part of the basin are exposed to the southerly gales. The inner or old port, formed by a pier projecting half a mile in a north-northwest direction from the shore, measures 1,800 by 1,500 feet, and is perfectly secure on all sides. To the south and east lie a number of docks, which, in turn, are connected with a system of canals complex enough to justify the name Little Venice applied to part of the city. The Canale dei Navicelli extends north to the Arno. Shipbuilding is the principal local industry, and even ironclads have been sent out from the dockyards. At present the activity of the port is due to exportation of Italian produce (especially from Tuscany), and the importation of iron, coal, fish, and general goods. Marseilles, Cardiff, and Newcastle are the three ports with which the dealings are most extensive. A considerable trade is also maintained with the United States. The population of Leghorn city increased from 33,000 in 1807 to 83,543 in 1861. By the census of Feb., 1901, the communal population of the city of Leghorn (Livorno) was 98,505. In 1900, 4,082 vessels of a gross tonnage of 1,761,643 tons entered and cleared at the port.

The earliest mention of Leghorn occurs in a document of the year 691 relating to the first church; in 1017 it is called a castle. In the thirteenth century the Pisans tried to attract a population to the spot, but it was not till the fourteenth that Leghorn began to be the rival of Porto Pisano, which it was destined ultimately to supplant. It was at Leghorn that Urban V. and Gregory XI. landed on their return from Avignon. When in 1405 the king of France sold Pisa to the Florentines he kept possession of Leghorn; but he afterward (1407) sold it for 26,000 ducats to the Genoese, and from the Genoese the Florentines purchased it in 1421. In 1496 the city showed its devotion to its new masters by a successful defense against Maximilian and his allies With the rise of the Medici came a rapid increase of prosperity; Cosmo, Francis, and Ferdinand erected fortifications and harbor works, warehouses and churches, with equal liberality, and the last especially gave a stimulus to trade by inviting "men of the East and the West, Spanish and Portuguese, Greeks, Germans, Italians, Hebrews, Turks, Moors, Armenians, Persians, and others," to settle and traffic in the city. Declared free and neutral in 1691, Leghorn was permanently invested with these privileges by the Quadruple Alliance in 1718; but in 1796 Napoleon seized all the hostile vessels in its port. It ceased to be a free city by law of 1867.

LEGION OF HONOR, Order of the. This order of merit was instituted by Napoleon in 1802, all previously existing French military or religious orders—those of St. Michael, the Holy Ghost, St. Louis, and Military Merit, as well as the united orders of St. Lazarus and Our Lady of Mount Carmel—having been abolished at the Revolution. All soldiers on whom sabers of honor had been already conferred were forthwith declared to be members, and all citizens of sufficient merit were declared to be eligible for admission, whatever their birth, rank, religion, or social position might be. At their reception they were required to swear upon their honor to employ all just, reasonable, and lawful means for the service of the Republic, the maintenance of its territory, the support of the government, the law and the public property, and to withstand every effort toward the restoration of the feudal system and its various accompaniments—in short, to coöperate as much as in them lay for the assertion of the principles of freedom and equality. The grand master was Napoleon himself; under him were 105 grand officers, 300 commanders, 450 officers, and 3,665 chevaliers. To the members of the various classes yearly allowances ranging from 5,000 francs in the case of a grand officer to 200 in that of a chevalier, were assigned. Some unimportant modifications in the details were made when the empire was introduced. Between 1805 and 1814 about 48,000 nominations were made, 1,400 only being in favor of civilians. Shortly after the accession of Louis XVIII. considerable changes took place. The old military and religious orders were restored, and that of the Legion of Honor reduced to the last place; the king was of course its grand master; the membership was divided into five grades—80 grand crosses, 160 grand officers, 400 commanders, 2,000 officers, and an indeterminate number of chevaliers. These fixed numbers were to be exclusive of members of the royal family, princes of the blood, and foreigners. Admission (the reward of at least twenty-five years of distinguished service) in ordinary cases was to be made to the grade of chevalier only; and only chevaliers of more than four years' standing, officers of two years' standing, and commanders of three years were to be eligible for promotion. The admissions were in every case to be made on parade in the case of military persons, and at a public sitting of a court of first instance in the case of civilians. The terms of the oath required were, of course, somewhat modified and the arrangements about yearly allowances could not be continued. After the revolution of July, the "Ordre royal de la légion d'honneur" again resumed the unique place and special character which had belonged to it under Bonaparte in 1802. But its constitution was again remodeled in 1852; the numbers of the grand crosses, grand officers, commanders and officers were fixed respectively at 80, 200, 1,000, and 2,000, the number of chevaliers being still left vague, while the system of annual allowances was restored. Since 1870 the maximum number of chevaliers has been fixed at 25,000, the remaining four classes having 70, 200, 1,000, and 4,000 assigned to them respectively. In each grade three-fifths must be military persons, the rest civilians. The yearly pension of a military chevalier is 250 francs, of an officer 500, of a commander 1,000, of a grand officer 2,000, and of a grand cross 3,000. The order may be conferred upon foreigners, but these do not count. It has occasionally been conferred upon women (*e.g.* Rosa Bonheur). In connection with the order there is an army medal, which may be distributed to the number of 40,000, and which entitles the bearer to a pension of 100 francs. On January 1, 1874, the military members of the legion in point of fact numbered 39,793, drawing 12,718,050 francs annually; and there were 51,460 holders of military medals drawing 5,146,000 francs, besides not less than 15,000 civil members drawing no pension. By economy in making new appointments, these numbers have subsequently been reduced. Since 1805 there has existed an institution for the education of daughters, sisters, and nieces of members of the legion; in 1809 the numbers were fixed at 600, the place being the "Maison d'éducation de St. Denis." The arrangements have subsequently been considerably extended. The decoration under the first empire consisted of a white enameled five-rayed star, bearing the portrait of Napoleon, and a wreath of oak and laurel, with the words "Napoleon, empereur des Français;" on the reverse was the French eagle grasping a thunderbolt, and the legend "Honneur et patrie." The ribbon was of watered scarlet silk. At present the obverse of the star bears the effigy of the republic and the words "République Française," the reverse two tricolor flags with the original legend.

LEH, or LÈ. See LADÁK.

LEIAH, a town in Derá Ismaíl India, Khan district, Punjab, is situated near the east bank of the Indus. The population in 1898 was 20,000.

LEIBNITZ, or LEIBNIZ, GOTTFRIED WILHELM, almost equally distinguished as philosopher, mathematician, and man of affairs, was born on June 21 (O.S.), 1646, at Leipsic, where his father was professor of moral philosophy. The name Leibniz, Leibnitz, or Lubeniecz was originally Slavonic, but his family was German, and for three generations his ancestors had been in the employment of the Saxon Government. Before he was twelve he could read Latin easily and had begun Greek; and his facility in writing Latin verses made his instructors fear that he would be seduced by poetry from more serious pursuits. Next he took with avidity to the study of logic, attempting already to reform its doctrines, and reading the scholastic and some of the Protestant theologians with such zeal that his friends now began to fear that he would never leave scholastic subtleties, "not knowing," as he said, "that my mind could not be satisfied with one kind of things."

In the autumn of 1661, at the age of fifteen, he entered the university of Leipsic as a student of law. It was at this time probably that he first made acquaintance with the modern thinkers who had already revolutionized science and philosophy, Francis Bacon, Cardan, and Campanella, Kepler, Galileo, and Descartes; and he began to discuss with himself the difference between the old and new ways of regarding nature. It was not, however, till the summer of 1663, which he spent at Jena under Weigel, that he obtained the instructions of a mathematician of repute; nor was the deeper study of mathematics entered upon till his visit to Paris and acquaintance with Huygens many years later.

The three years following his return from Jena were devoted to legal studies, and in 1666 Leibnitz became a candidate for the degree of doctor of law. The doctorate was a pathway to the post of assessor which he coveted, but through the opposition of older candidates for the same office his youth was made an excuse for refusing him the degree. Upon this he left his native town forever. The doctor's degree refused him there was at once (November 5, 1666) conferred on him at Altdorf, the university town of the free city of Nuremberg, where his brilliant dissertation procured him the immediate offer of a professor's chair. This, however, he declined.

Leibnitz, not yet twenty-one years of age, was already the author of several remarkable essays. In his bachelor's dissertation *De principio individui* (1863) he defended the nominalistic doctrine that individuality is constituted by the whole entity or essence of a thing; his arithmetical tract *De complexionibus*, published in an extended form under the title *De arte combinatoria* (1666), is an essay toward his lifelong project of a reformed symbolism and method of thought; and besides these there are four juridical essays, including the *Nova methodus docendi discendique juris*, written in the intervals of his journey from Leipsic to Altdorf. This last essay is remarkable, not only for the reconstruction it attempted of the *Corpus Juris*, but as containing the first clear recognition of the importance of the historical method in law.

Rejecting the professorial career, but without any definite plan for the future, Leibnitz turned his steps to Nuremberg. That city was a center of the Rosicrucians, and Leibnitz, busying himself with writings of the alchemists, soon gained such a knowledge of their tenets that he was supposed to be one of the secret brotherhood, and was even elected their secretary. A more important result of his visit to Nuremberg was his acquaintance with Johann Christian von Boineburg, formerly first minister to the elector of Mainz, and one of the most distinguished statesmen of the day. By his advice Leibnitz printed his *Nova Methodus* in 1667, dedicated it to the elector, and, going to Mainz, presented it to him in person. It was thus that Leibnitz entered the service of the elector of Mainz, at first as an assistant in the revision of the statute-book, afterward on more important work.

The policy of the elector, which the pen of Leibnitz was now called upon to promote, was to maintain the security of the German empire, threatened on the west by the aggressive power of France, on the east by Turkey and Russia. Thus when in 1669 the crown of Poland became vacant, it fell to Leibnitz to support the claims of the German candidate, which he did in his first political writing, *Specimen Demonstrationum Politicarum*, attempting, under the guise of a Catholic Polish nobleman, to show by mathematical demonstration that it was necessary in the interest of Poland that it should have the count palatine of Neuburg as its king. But neither the diplomatic skill of Boineburg, who had been sent as plenipotentiary to the election at Warsaw, nor the arguments of Leibnitz were successful, and a Polish prince was elected to fill the vacant throne.

A greater danger threatened Germany in the aggressions of Louis XIV. and the wars of conquest on which he was entering. Though Holland was in most immediate danger from his arms, the seizure of Lorraine in 1670 showed that Germany too was threatened. It was in this year that Leibnitz wrote his *Thoughts on Public Safety*, in which he urged the formation of a new "Rheinbund" for the protection of Germany, and contended that the states of Europe should employ their power, not against one another, but in the conquest of the non-Christian world, in which Egypt, "one of the best situated lands in the world," would fall to the share of France.

Leibnitz had other than political ends in view in his visit to France. It was as the center of literature and science that Paris chiefly attracted him. Political duties never made him lose sight of his philosophical and scientific interests.

Leibnitz thus came to Paris, not merely as a young diplomatist on an important if not very hopeful mission, but also as an author who had already made his debut in the world of science and philosophy. At Paris he met with Arnauld, Malebranche, and, more important still, with Christian Huygens. This was preëminently the period of his mathematical and physical activity. Before leaving Mainz he was able to announce an imposing list of discoveries, and plans for discoveries, arrived at by means of his new logical art, in natural philosophy, mathematics, mechanics, optics, hydrostatics, pneumatics, and nautical science, not to speak of new ideas in law, theology, and politics. Chief among these discoveries was that of a calculating machine for performing more complicated operations than that of Pascal—multiplying, dividing, and extracting roots, as well as adding and subtracting. This machine was exhibited to the Academy of Paris and to the Royal Society of London, and Leibnitz was elected a fellow of the latter society in April, 1673. In January of this year he had gone to London as an attaché on a political mission from the elector of Mainz, returning in March to Paris, and while in London had become personally acquainted with Oldenburg, the secretary of the Royal Society, with whom he had already corresponded, with Boyle the chemist, and Pell the mathematician. It is from this period that we must date the impulse that directed him anew to mathematics. By Pell he had been referred to Mercator's *Logarithmotechnica* as already containing some numerical observations which Leibnitz had thought original on his own part; and, on his return to Paris, he devoted himself to the study of higher geometry under Huygens, entering almost at once upon the series of investigations which culminated in the discovery of the differential and integral calculus.

Shortly after his return to Paris, in 1673, Leibnitz ceased to be in the Mainz service any more than in name, but in the same year entered the employment of Duke John Frederick of Brunswick-Lüneburg, with whom he had corresponded for some time. In 1676 he removed, at the duke's request, to Hanover, traveling thither by way of London and Amsterdam. At the latter place he saw and conversed with Spinoza, now in the last year of his life.

For the next forty years and under three successive princes, Leibnitz was in the service of the Brunswick family, and his headquarters were at Hanover, where he had charge of the ducal library. In leaving the electorate of Mainz for the dukedom of Brunswick, Leibnitz passed into a political atmosphere formed by the dynastic aims of the typical German state.

About this time, too, his thoughts and energies were partly taken up with the scheme for the reunion of the Catholic and Protestant Churches. While at Mainz he had joined in an attempt made by the elector and Boineburg to bring about a reconciliation, and now, chiefly through the energy and skill of the Catholic Royas de Spinola, and from the spirit of moderation which prevailed among the theologians he met with at Hanover in 1683 it almost seemed as if some agreement might be arrived at. It was in these circumstances that, in 1686, Leibnitz wrote his *Systema theologicum*, in which he strove to find common standing-ground for Protestants and Catholics in the details of their creeds. But the English Revolution of 1688, and the establishment of the Protestant succession, became a political obstacle to the prosecution of the scheme in Hanover, while it was soon found that the religious difficulties were greater than had at one time appeared. Spinola's practical and conciliatory tone did not make full allowance for the ecclesiastical and dogmatical claims of Rome, and the moderation of the Hanover theologians was not fairly representative of the spirit of the Protestant Churches. In the letters to Leibnitz from Bossuet, the landgrave of Hessen-Rheinfels, and Madame de Brinon, the aim is obviously to make converts to Catholicism, not to arrive at a compromise with Protestantism, and when it was found that Leibnitz refused to be converted the correspondence ceased. A further scheme of church union in which Leibnitz was engaged, that between the Reformed and Lutheran Churches, met with no better success.

Returning from Italy in 1690, Leibnitz was appointed librarian at Wolfenbüttel by Duke Anton, of Brunswick-Wolfenbüttel. Some years afterward began his connection with Berlin through his friendship with the electress Sophie Charlotte, of Brandenburg, and her mother, the princess Sophie, of Hanover. He was invited to Berlin in 1700, and on July 11th of that year the academy he had planned was founded, with himself as its president for life. In the same year he was made a privy councilor of justice by the elector of Brandenburg. Four years before he had received a like honor from the elector of Hanover, and twelve years afterward the same distinction was conferred upon him by Peter the Great, to whom he gave a plan for an academy at St. Petersburg, carried out after the czar's death. At Berlin, in the pleasant suburb of Charlottenburg, Leibnitz read and philosophized with his royal pupil, whose death in 1705 was the greatest loss he ever suffered. After this event his visits to Berlin became less frequent and less welcome, and in 1711 he was there for the last time. In the following year he undertook his fifth and last journey to Vienna, where he stayed till 1714. An attempt to found an academy of science there was defeated by the opposition of the Jesuits, but he now attained the honor he had coveted of an imperial privy councilorship (1712), and either at this time or on a previous occasion, was made a baron of the empire. Leibnitz returned to Hanover in September, 1714, but found the elector George Louis had already gone to assume the crown of England. Leibnitz would gladly have followed him to London, but was bidden remain at Hanover and finish his history of Brunswick.

During the last thirty years Leibnitz's pen had been busy with many matters. Mathematics, natural science, philosophy, theology, history, jurisprudence, politics (particularly the French wars with Germany, and the question of the Spanish succession), economics, and philology, all gained a share of his attention; almost all of them he enriched with original observations.

His genealogical researches in Italy—through which he established the common origin of the families of Brunswick and Este—were not only preceded by an immense collection of historical sources, but enabled him to publish materials for a code of international law. The history of Brunswick itself was the last work of his life, and had covered the period from 768 to 1005 when death ended his labors. But the government, in whose service and at whose order the work had been carried out, left it to lie unheeded in the archives of the Hanover library, till it was published by Pertz in 1843.

It was in the years between 1690 and 1716 that Leibnitz's chief philosophical works were composed, and during the first ten of these years the accounts of his system were, for the most part, preliminary sketches. Indeed, he never gave a full and systematic account of his doctrines. His views have to be gathered from letters to friends, from occasional articles in the *Acta Eruditorum*, the *Journal des Savants*, and other journals, and from one or two more extensive works. It is evident, however, that philosophy had not been entirely neglected in the years in which his pen was almost solely occupied with other matters. The appearance of Locke's *Essay* in 1690 induced him (1696) to note down his objections to it, and his own ideas on the same subjects. In 1703–4 these were worked out in detail and ready for publication, when the death of the author whom they criticised prevented their apppearance. In 1710 appeared the only complete and systematic philosophical work of his lifetime, *Essais de Théodicée sur la bonté de Dieu, la liberté de l'homme, et l'origine du mal*, originally undertaken at the request of the late queen of Prussia, who had wished a reply to Bayle's opposition of faith and reason. In 1714 he wrote, for Prince Eugene of Savoy, a sketch of his system under the title of *La Monadologie*, and in the same year appeared his *Principes de la nature et de la grace*. The last few years of his life were perhaps more occupied with correspondence than any others, and, in a philosophical regard, were chiefly notable for the letters which, through the desire of the new queen of England, he interchanged with Clarke, *sur Dieu, l'âme, l'espace, la durée*. Leibnitz died on November 14, 1716.

LEICESTER, an inland county of England, is bounded north by Nottinghamshire, east by Lincolnshire and Rutland, southeast by Northamptonshire, southwest by Warwickshire, and northwest by Derbyshire. It has the form of an irregular hexagon, its greatest length being about forty-four miles, and its greatest breadth about forty miles. The area comprehends 511,719 acres, or nearly 800 square miles.

The surface of the county is an undulating tableland, the highest eminences being the rugged Charnwood hills in the northwest, one of which, Bardon Hill, has an elevation of 902 feet. The county belongs chiefly to the basin of the Trent, which forms for a short distance its boundary with Derbyshire. Besides the Soar the other tributaries of the Trent are the Anker, the Devon, and the Mease. The Avon after receiving the Swift passes into Warwickshire to join the Severn, and the Welland forms for some distance the boundary between Leicester and Northampton. The principal canals are the Union and Grand Union, which with their various branches are connected with the Grand Junction canal in Northamptonshire, and the Ashby-de-la-Zouch canal, which crosses the western corner of the county to Nuneaton, where it joins the Coventry canal.

LEICESTER, a municipal and parliamentary borough and market-town of England, and the chief town of the county of Leicester, is situated at the intersection of several railway lines, in a gentle hollow on the river Soar, ninety-seven miles north-northwest of London, and twenty-seven south of Nottingham. The town is well built, the streets are spacious and regular, and the sanitary and water arrangements are very satisfactory. One of the ornaments of the town is the memorial clock-tower erected in 1868 in honor of Simon de Montfort and three other less known persons connected with the district. The staple trade of Leicester is hosiery, including stockings and all kinds of fancy goods. There are also iron-foundries, and manufactures of boots and shoes, elastic webs, and sewing cotton. The population of the municipal and parliamentary borough was, in 1901, 211,574, and of the county, 225,896. It returns two members to the parliament of the United Kingdom.

LEICESTER, SIMON DE MONTFORT, EARL OF. See MONTFORT.

LEICESTER, ROBERT DUDLEY, EARL OF (1531–1588). This favorite of Queen Elizabeth came of an ambitious family. They were not, indeed, such mere upstarts as their enemies loved to represent them; for Leicester's grandfather—the notorious Edmund Dudley, who was one of the chief instruments of Henry VII.'s extortions—was descended from a younger branch of the barons of Dudley. But the love of power was a passion which seems to have increased in them with each succeeding generation, and though the grandfather was beheaded by Henry VIII., for his too devoted services in the preceding reign, the father grew powerful enough in the days of Edward VI. to trouble the succession to the crown. This was that John Dudley, duke of Northumberland, who contrived the marriage of Lady Jane Grey with his own son Guildford Dudley, and involved both her and her husband in a common ruin with himself. Robert Dudley, the subject of this article, was an elder brother of Guildford, and shared at that time in the misfortunes of the whole family. Having taken up arms with them against Queen Mary, he was sent to the Tower, and was actually sentenced to death; but the queen afterward not only pardoned and restored him to liberty, but appointed him master of the ordnance. On the accession of Elizabeth he was also made master of the horse. He was then, perhaps, about seven and twenty, and was evidently rising rapidly in the queen's favor. At an early age he had been married to Amy, daughter of Sir John Robsart. The match had been arranged by his father, who was very studious to provide in this way for the future fortunes of his children, and the wedding was graced by the presence of King Edward. But it was not a happy marriage. The lady lived alone at Cumnor Hall in Berkshire, the house of one Anthony Forster, and there in the year 1560 she died under circumstances which certainly aroused some suspicions of foul play. The scandal was the more serious as it was insinuated that Dudley stood so high in the queen's favor that he might reasonably hope to marry her, and that a murder had been deliberately planned to remove an obstacle to his advancement. The point, it must be owned, is not free from obscurity, and recent revelations from the archives of Simancas prove that even before the unhappy lady's death it was said there was a design to poison her. After the event, however, the story was that she had broken her neck by a fall down stairs, and, suspicious as the case may appear, there is much to be said in favor of Dudley's innocence. Certain it is that he continued to rise in the queen's favor. She made him a Knight of the Garter, and bestowed on him the castle of Kenilworth, the lordship of Denbigh, and lands of great value in Warwickshire and in Wales. In September, 1564, she created him baron of Denbigh, and immediately afterward earl of Leicester. In the preceding month, when she visited Cambridge, she at his request addressed the university in Latin. The honors shown him naturally excited jealousy, especially as it was well known that he entertained still more ambitious hopes, which the queen apparently did not altogether discourage. The earl of Sussex, in opposition to him, strongly favored a match with the archduke Charles of Austria. The court was divided, and, while arguments were set forth on the one side against the queen's marrying a subject, the other party insisted strongly on the disadvantages of a foreign alliance. The queen, however, was so far from being foolishly in love with him that in 1564 she recommended him as a husband for Mary Queen of Scots. But even this, it was believed, was only a blind, and indeed it may be doubted how far the proposal was serious. After his creation as earl of Leicester great attention was paid to him both at home and abroad. The university of Oxford made him chancellor, and Charles IX. of France sent him the order of St. Michael. A few years later he formed an ambiguous connection with the baroness dowager of Sheffield, which was maintained by the lady, with great appearance of truth, to have been a valid marriage, though it was concealed from the queen. Long afterward, in the days of James I., their son, Sir Robert Dudley, a man of extraordinary talents, sought to establish his legitimacy; but his suit was suddenly brought to a stop, and the documents connected with it sealed up by an order of the Star Chamber, without any reasons being assigned.

In 1575 Queen Elizabeth visited the earl at Kenilworth, where she was entertained with great magnificence. The picturesque account of the event given by Sir Walter Scott has made everyone familiar with the general character of the scene. Next year Walter, earl of Essex, with whom Leicester had had some differences, died in Ireland, not without suspicion of poison, and Leicester's subsequent marriage with his widow again gave rise to very serious imputations against him. This marriage, like the former, was kept secret at first; but it was revealed to the queen in 1579 by Simier, an emissary of the duke of Alençon, to whose projected match with Elizabeth the earl seemed to be the principal obstacle. The queen showed great displeasure at the news, and had some thought, it is said, of committing Leicester to the Tower, but was dissuaded from doing so by his rival the earl of Sussex. In February, 1582, Leicester, along with a number of other noblemen and gentlemen, escorted the duke of Alençon on his return to Antwerp to be invested with the government of the Low Countries. In 1584 he inaugurated an association for the protection of Queen Elizabeth against conspirators. About this time there issued from the press the famous pamphlet, believed to have been the work of Parsons the Jesuit, entitled *Leicester's Commonwealth*, which was intended to suggest to the people that the English constitution was subverted and the government handed over to one who was at heart an atheist and a traitor, besides being a man of infamous life and morals. In 1585 he was appointed commander of an expedition to the Low Countries in aid of the revolted provinces, and sailed with a fleet of fifty ships to Flushing, where he was received with great enthusiasm. In January following he was invested with the government of the provinces, but immediately received a strong reprimand from the queen for taking upon himself a function which she had not authorized. Both he and the States-General were obliged to apologize. His nephew, Sir Philip Sidney, was slain at the unsuccessful siege of Zutphen, and complaints were made by the States-General of the conduct of the whole campaign. He returned to England for a time, and went back in 1587, when he made an abortive effort to raise the siege of Sluys. Disagreements increasing between him and the States, he was recalled by the queen, from whom, contrary to the expectation of his enemies, he met with a very good reception; and he continued in such favor that in the following summer (the year of the Armada, 1588) he was appointed lieutenant-general of the army mustered at Tilbury to resist Spanish invasion. After the crisis was past he was returning homeward from the court to Kenilworth, when he was attacked by a sudden illness and died at his house at Cornbury, in Oxfordshire, on September 4th.

LEIGH, a market and manufacturing town of Lancashire, England, is situated on several branch railway lines, seven and one-half miles southwest of Bolton. The population of the district was 17,623 in 1871 and about 25,000 in 1901.

LEIGH, Edward (1602–1671), Puritan linguist and theologian, was born in 1602 at Shawell, Leicestershire, England.

LEIGHTON, Robert, bishop of Dunblane, and afterward archbishop of Glasgow, was the eldest son of Doctor Alexander Leighton, the author of *Zion's Plea against the Prelacie*, whose terrible sufferings for having dared to question the divine right of Episcopacy, under the persecution of Laud, form one of the most disgraceful incidents of the reign of Charles I. Doctor Leighton is said to have been of the old family of Ulishaven in Forfarshire, and his illustrious son was born in the year 1611. From his earliest childhood, according to Burnet, he was distinguished for his saintly temper and disposition, and in his sixteenth year (1627) he was sent to complete his education at the university of Edinburgh, where, after studying with distinguished success for four years, he took his degree of M.A. in 1631.

After leaving college his father sent him to travel abroad, and he is understood to have spent several years in France, where he acquired a complete mastery of the French language. The exact period of his return to Scotland has not been ascertained; but in 1641 he was ordained Presbyterian minister of Newbattle in Midlothian, where he continued for about ten years. At the end of that period he resigned his charge, and went to reside in Edinburgh (1652). Early in the following year (1853) he was appointed principal at the university of Edinburgh, and primarius professor of divinity.

In 1661, when Charles II. had resolved to force Episcopacy once more upon Scotland, he fixed upon Leighton for one of his bishops. He did what he could, governing his diocese (that of Dunblane) with the utmost mildness, as far as he could preventing the persecuting measures which were in active operation elsewhere, and endeavoring to persuade the Presbyterian clergy to sink their differences and come to an accommodation with their Episcopal brethren. He at length determined to resign his bishopric, and went up to London in 1665 for this purpose. In 1669 Leighton again went to London and made fresh representations on the subject, which were so far attended to, but, partly perhaps from faults on the Presbyterian as well as the Episcopalian side, little result followed. In utter despair of being able to be of any further service to the cause of religion, he at length in 1674 threw up the archbishopric and retired to the house of his widowed sister, Mrs. Lightmaker, at Broadhurst, in Sussex. Here he spent the remaining ten years, in all likelihood the happiest of his life, and died somewhat suddenly on a visit to London in 1684, in the seventy-fourth year of his age.

LEIGHTON-BUZZARD, a market-town of Bedfordshire, is situated on the river Ouse, which there divides Bedford from Bucks, and on the Northwestern Railway, forty miles north of London. Population (1901), about 15,000.

LEINSTER. See IRELAND.

LEIPSIC (in German *Leipzig*), the second town of the kingdom of Saxony in size, and the first in commercial importance, is situated in a large and fertile plain about sixty-five miles northwest of Dresden and six miles from the Prussian frontier. It stands just above the junction of three small rivers, the Pleisse, the Parthe, and the Elster, which flow in various branches through or round the town, and afterward, under the name of Elster, discharge themselves into the Saale. Though of unimposing exterior, Leipsic is one of the most prosperous and enterprising of German towns. Besides being the most important commercial city in Germany next to Hamburg, it possesses the second largest German university, is the headquarters of the supreme courts of the empire, and forms one of the most prominent literary and musical centers in Europe.

The old town, with its narrow streets and numerous houses of the sixteenth and seventeenth centuries, still preserves much of its quaint mediæval aspect. The Pleissenburg, or citadel, now used for barracks and public offices, dates from the middle of the sixteenth century. Auerbach's Keller, a curious old wine vault, is interesting for the use made of it by Goethe in his *Faust;* it contains a series of mural paintings of the sixteenth century, representing the legend on which the play is based. The business of Leipsic is chiefly concentrated in the inner city, but the headquarters of the book trade lie in the east suburb. The streets of the suburbs are mostly broad and well built. The most notable modern buildings are the new theater, an imposing Renaissance structure designed by Langhaus, and the museum, which stand facing each other at opposite ends of the spacious Augustus-Platz. Most of the west side of the same square is occupied by the Augusteum, or main building of the university, which also possesses several special institutes in another part of the town. The new district law courts are contained in a large and substantial though not specially imposing building, and the municipal hospital and the hospital of St. John are also handsome edifices. The so-called Roman House, with loggie and frescoes in the Italian style, is the only private dwelling demanding remark. The churches of Leipsic are comparatively uninteresting. The university of Leipsic, founded in 1409 by a secession of 2,000 German students from Prague, has long ranked among the most important in Germany. A few years ago it was also the most numerously attended, but it is now outstripped by Berlin, which has about 5,431 students, as compared with 3,517 at Leipsic (1901). The professors and "Privatdocenten," or lecturers, number about 223. The university library contains 350,000 volumes and 4,000 manuscripts; it occupies the Paulinum, a characteristic specimen of old monastic architecture, dating in part from 1229–1240. The other educational institutions of Leipsic include three gymnasia, two "Realschulen," a commercial academy (*Handelsschule*), a high school for girls, another for boys, and a large number of admirable public and private schools of a lower grade.

The number of literary, scientific, and artistic institutions in Leipsic is unusually large for the size of the town. One of the most important is the museum, which contains about four hundred modern paintings, a large number of casts, a few pieces of original sculpture, and a well-arranged collection of drawings and engravings. The art-industrial museum, the collection of the historical society, and the ethnographical museum are also of considerable interest. As a musical center Leipsic is known all over the world for its excellent conservatorium, founded in 1843 by Mendelssohn-Bartholdy. The prominence of the publishing interest has attracted to Leipsic a large number of gifted authors, and made it a literary center of considerable importance. About two hundred and seventy newspapers and periodicals are published here, including several of the most widely circulated in Germany.

The outstanding importance of Leipsic as a commercial town is mainly derived from its three great fairs, which annually attract a concourse of about forty thousand merchants from all parts of Europe, and from Persia, Armenia, and other Asiatic countries. The most important fairs are held at Easter and Michaelmas, and are said to have been founded as markets about 1170. The smaller New Year's fair was established in 1458. During the Thirty Years' War, the Seven Years' War, and the troubles consequent upon the French Revolution, the trade of the Leipsic fairs considerably decreased, but it recovered itself after the accession of Saxony to the German Customs Union in 1833, and for the next twenty years rapidly and steadily increased. It is impossible to give accurate statistics of the business done at the fair, but the value of the sales considerably exceeds $50,000,000 per annum. The principal commodity is furs (chiefly American and Russian); next in order come leather, hides, wool, cloth, linen, and glass. The Leipsic wool-market, held for two days in June, is also important.

In the trades of bookselling and publishing Leipsic occupies a unique position, not only taking the first place in Germany, but even surpassing London and Paris in the number and total value of its sales. There are upward of 300 publishers and booksellers in the town, and about 5,000 firms in other parts of Europe are represented here by commissioners. About 2,500 books, or one-sixth of the total production of Germany, are published in Leipsic annually. Several hundred booksellers assemble in Leipsic every year at Jubilate, and settle their accounts at their own exchange. Leipsic also contains seventy printing works, some of great extent, and a corresponding number of type foundries, binding shops, and other kindred industries. The so-called "polygraphic" industries give employment to nearly 10,000 hands.

The population of Leipsic has been quintupled within the present century, rising from 31,887 in 1801 to 153,988, in 1881, and has of late increased at the rate of between 3 and 4 per cent. per annum. With the suburban villages the population in 1901 was 455,089.

The first historical mention of Leipsic occurs in a writing of the beginning of the eleventh century, when it is spoken of as an "urbs," or fortified place. In 1134 it came into the possession of Conrad of Wettin, margrave of Meissen, and under Margrave Otho the Rich (1156–89) it received many important privileges, and became a flourishing town of 5,000 to 6,000 inhabitants. Its favorable situation, almost equidistant from the Baltic Sea and the Alps, the Rhine and the Oder, in the midst of a fertile plain intersected by the principal highways of central Europe from north to south and east to west, coöperated with the fostering care of the margraves in raising it in the fifteenth century to the position of one of the most important commercial towns in Germany. The growth of its fairs, which of course were mainly instrumental in producing this result, has been above described. The famous conference between Luther and Doctor Eck, held in the Leipsic Pleissenburg in 1519, did much for the spread of the Reformation, but it was not till twenty years later that Leipsic formally espoused the Protestant cause. In 1547, in the war of the Smalkaldic league, the town was besieged and the suburbs reduced to ashes, and during the Thirty Years' War it suffered six sieges and was four times occupied by hostile troops. Its commerce was also greatly interrupted by the Seven Years' War. The publishing trade of Leipsic began to grow important toward the end of the seventeenth century, when the severity of the censorship at Frankfort-on-the-Main caused many of its booksellers to emigrate to Leipsic. The preliminary years of the French Revolutionary wars were not unfavorable to the commerce of Leipsic, but in 1813 and 1814 the town suffered greatly. Its accession to the Zollverein in 1833 and the establishment of the German system of railways (of which Leipsic is an important center) inaugurated a period of great prosperity, which has continued to the present day. The revolutionary riots of 1848–49 and the Prussian occupation in 1866–67 were merely passing shadows. In 1879 Leipsic acquired a new importance by becoming the seat of the supreme courts of the German empire.

The immediate neighborhood of Leipsic had been the scene of numerous battles, two of which are of more than ordinary importance, viz., the battle of Breitenfeld in 1631, and the great battle of Leipsic, known in Germany as the *Völkerschlacht*, fought in 1813 between Napoleon and the allied forces of Russia, Germany, and Austria.

LEITH, a municipal and parliamentary burgh of Midlothian, the chief seaport of the east coast of Scotland, one and three-fourths miles north-by-east of Edinburgh, with which it is connected by Leith Walk and other lines of street. It is built on the southern shore of the Firth of Forth, at the mouth of the Water of Leith, which, crossed by seven bridges, divides it into North and South Leith. Leith Fort, the headquarters of the royal artillery in Scotland, dates from 1779; the quaint old Tolbooth, where Maitland of Lethington poisoned himself (1573), was demolished in 1819; and the public buildings one and all are modern, most of them classical structures. The population in 1901 was 76,667.

The history of Leith is closely connected with that of Edinburgh, episodes being the burning of its shipping by the English in 1313 and 1410, its sack by them in 1544 and 1547, its tenure by Mary of Guise as stronghold of the Catholic party from 1548 to 1560 and ineffectual siege in the latter year by the Scotch and English allies, the sailing from it of the first Darien expedition in 1698, and the seizure of its citadel by Brigadier Mackintosh of Borlum and 1,600 Highland Jacobites in 1715, to which may be added the arrival, departure, or visit of James II. (1437), Mary Queen of Scots (1561), James VI. and his queen Anne of Denmark (1590), Charles I., who is said to have first got tidings of the Irish rebellion (1641), when playing golf upon the Links, Cromwell and Charles II. (1650), George IV. (1822), Queen Victoria (1842), the king of Denmark (1874), and the duke of Edinburgh (1881).

LEITMERITZ, an episcopal see and chief town of Leitmeritz district, Bohemia, is situated on the right bank of the Elbe, crossed there by an iron bridge 1,700 feet in length, and on the Austrian North-Western Railway, about thirty-five miles north-northwest of Prague. Population, 10,854.

LEITRIM, a maritime county of Ireland in the province of Connaught, is bounded by Donegal Bay, Fermanagh, Cavan, Longford, and by Roscommon and Sligo. Its shape resembles that of an hour-glass. From about twenty miles at the extremities it narrows in the center to a breadth of only seven miles, and its greatest length from southeast to northwest is fifty-two miles. The pop. (1901) was 69,201; the area is 619 square miles.

The northern portion of the county consists of an elevated table-land, of which the highest summits are Lugnaquila, 1,485 feet; Benbo, 1,365; and Lacka, 1,315. In the southern part the country is comparatively level, and is generally richly wooded. The extent of coast-line is only about three miles. The principal river is the Shannon, which, issuing from Lough Allen, forms the southwestern boundary of the county with Roscommon. The Bonnet rises in the northwest and flows to Lough Gill, and the streams of Bundrows and Bunduff separate Leitrim from Donegal and Sligo. Besides Lough Allen, which has an area of 8,900 acres, the other principal lakes in the county are Lough Macnean, Lough Scur, Lough Gill, and Lough Melvin. A canal from Carrick-on-Shannon passes through the county to Lough Erne.

The central part of the county round Lough Allen is included in the Connaught coal-fields which both north and south is bounded by carboniferous limestone interspersed with millstone grit and Yoredale beds. In the southern districts there is a considerable extent of bog resting on marl or blue clay. The coal is bituminous, and is well suited for manufacturing purposes; but it is not extensively wrought. The climate is very moist and unsuitable for grain crops.

The acreage under crops is less than one-fourth of the whole area. In 1880 there were 212,374 acres under pasture, and 78,330 waste. The number of horses in 1881 was 3,983, of which 2,627 were used for agricultural purposes. Between 1855 and 1881 cattle diminished from 91,061 to 84,914. In 1760 the population was 26,142, which in 1821 had increased to 124,785 and in 1841 to 155,309, but in 1861 had diminished to 104,743, in 1871 to 95,562, and in 1901 to 69,201, of whom 35,000 were males and 34,201 were females. The total number of emigrants from the county between May 1, 1851, and December 31, 1880, was 93,186, a percentage of 41.2 to the population in 1861.

LELAND, LEYLAND, or LAYLONDE, JOHN, a famous English antiquary, was born probably in 1506, and died in 1552, in London, during the reign of Queen Mary.

LELAND, JOHN, a polemical theologian of the eighteenth century, was born at Wigan, Lancashire, England, in 1691, and died in 1766.

LELEGES was the name applied to an early race or set of races around the Ægean Archipelago. The name occurs in Leucadia, Acarnania, Ætolia, Phocis, Locris, Bœotia, Megara, Laconia, Elis, the islands of the Ægean, the Troad, and Caria. It is hardly possible to suppose that a single race was to be found in so many widely separated localities. Herodotus identifies the Leleges with the Carians, saying that the ancient name of that race was Leleges, whereas Pausanias declares that the name Leleges was younger, and Athenæus makes the Leleges serfs of the Carians. Homer introduces both Leleges and Carians as distinct peoples in alliance with Troy.

LELEWEL, JOACHIM (1786–1861), Polish historian, was born at Warsaw.

LELY, Sir Peter, a celebrated painter, was born at Soest, Westphalia, in 1617. His father, a military captain and a native of Holland, was originally called Van der Vaes; the nickname of Le Lys or Lely, by which he was generally known, was adopted by his son as a proper surname. After studying for two years under Peter de Grebber, an artist of some note at Haarlem, Lely, induced by the patronage of Charles I. for the fine arts, removed to England in 1641. There he at first painted historical subjects and landscape; and he soon became so eminent in his profession as to be employed by Charles to paint his portrait shortly after the death of Vandyck. He afterward portrayed Cromwell. At the Restoration his genius and gentlemanly manners won the favor of Charles II., who made him his state-painter, and afterward knighted him. He formed a famous collection, the best of his time, containing drawings, prints, and paintings by the best masters; it sold by auction for no less than £26,000. His great example, however, was Vandyck, whom, in some of his most successful pieces, he almost rivals. His most famous work is a collection of portraits of the ladies of the court of Charles II., preserved at Hampton Court, and known by the title of the *Windsor Beauties*. Of his few historical pictures, the best is *Susannah and the Elders*, at Burleigh House. His *Jupiter and Europa*, in the duke of Devonshire's collection, is also worthy of note. Lely was nearly as famous for crayon work as for oil-painting. Toward the close of his life he often retired to an estate which he had bought at Kew. He died of apoplexy in London (the Piazza, Covent Garden) in 1680, and was buried in Covent Garden Church, where a monument was afterward erected to his memory.

LE MANS. See Mans, Le.

LEMARS, or Le Mars, capital of Plymouth county, Iowa, is situated at the junction of several railroads. It has two banks, two steam flourmills, and a large shipping trade in grain and stock. It has two weekly newspapers, several churches and good schools, and a population (1900) of 4,146.

LEMBERG (*i.e.*, *Leonberg;* also *Lemburg* or *Löwenburg*), the capital of the Austrian crown-land of Galicia, and according to its population the third city of Austria-Hungary, lies 180 miles east of Cracow and sixty miles from the Russian frontier. The Löwenburg proper or Castle Hill rises to 1,300 feet. In the early part of the present century Lemberg would have been described as a small fortified place, with a number of large villages in the immediate vicinity; but the fortifications were transformed into pleasure grounds about 1811, and the villages have gradually changed into suburb and town. The old city proper occupies only about sixty acres; the suburbs extend over twelve square miles. During the sixteenth and seventeenth centuries the most striking feature of Lemberg was the immense number of its ecclesiastical buildings, and it still possesses among the rest a Greek Catholic, a Roman Catholic, and an Armenian cathedral. The church of the Dominicans (an imitation of the Karlskirche at Vienna) contains a monument by Thorwaldsen, to the countess Josepha Borkowska. Lemberg is the seat of a university, founded in 1784 by Joseph II., and restored by Francis I., in 1817; and in the national institution founded by Ossolinski it has a noble library of books and manuscripts, and valuable antiquarian and scientific collections. The linguistic heterogeneousness of the population requires the maintenance of three separate gymnasiums—for the Poles, the Germans, and the Ruthenians, respectively. The population has increased from 87,109 in 1869 to 160,000 in 1901.

LEMMING, a small animal belonging to the order *Rodentia*, family *Muridæ*, and subfamily *Arvicolinæ*, or voles, of which the common water-rat and short-tailed field-mouse of England are members. It is the *Myodes lemmus* (Linn.) of most modern zoölogical systems. In both size and color different specimens vary considerably, but its usual length is about five inches, and its soft fur yellowish-brown, marked with spots of dark brown and black. It has a short, rounded head, obtuse muzzle, small bead-like eyes, and short rounded ears, nearly concealed by the fur. The tail is very short. The feet are small, each with five claws, those of the fore feet strongest, and fitted for scratching and digging. The usual dwelling place of the lemmings is in the high lands or fells of the great central mountain chain of Norway and Sweden. The nest is formed under a tussock of grass or a stone, and constructed of short dry straws, and usually lined with hair. The number of young in each nest is generally five, sometimes only three, occasionally seven or eight, and at least two broods are produced annually. Their food is entirely vegetable, especially grass roots and stalks, shoots of the dwarf birch, reindeer lichens, and mosses, in search of which they form, in winter, long galleries through the turf or under the snow. They are restless, courageous, and pugnacious little animals. When suddenly disturbed, instead of trying to escape they will sit upright, with their back against a stone or other coign of vantage, hissing and showing fight in a very determined manner.

The circumstance which has given more popular interest to the lemming than to a host of other species of the same order of animals is that certain districts of the cultivated lands of Norway and Sweden, where in ordinary circumstances they are quite unknown, are occasionally and at very uncertain intervals varying from five to twenty or more years, literally overrun by an army of these little creatures, which steadily and slowly advance, always in the same direction, and regardless of all obstacles, swimmimg across streams and even lakes of several miles in breadth, and committing considerable devastation on their line of march by the quantity of food they consume. In their turn they are pursued and harassed by crowds of beasts and birds of prey, as bears, wolves, foxes, dogs, wildcats, stoats, weasels, eagles, hawks, and owls, and never spared by man; even the domestic animals not usually predacious, as cattle, goats, and reindeer, are said to join in the destruction, stamping them to the ground with their feet, and even eating their bodies. Numbers also die from diseases produced apparently from overcrowding. None ever return by the course by which they came, and the onward march of the survivors never ceases until they reach the sea, into which they plunge, and swimming onward in the same direction as before perish in the waves. These extraordinary and sudden appearances of vast bodies of lemmings, and their singular habit of persistently pursuing the same onward course of migration, have given rise to various speculations, from the ancient belief of the Norwegian peasants, shared in by Olaus Magnus, that they fell down from the clouds, to the almost equally untenable hypothesis, ingeniously maintained by the late Mr. W. D. Crotch, that they are acting in these migrations in obedience to an instinct inherited from vastly ancient times, and are still seeking the congenial home in the submerged Atlantis, to which their ancestors of the Miocene period were wont to resort when driven from their ordinary dwelling places by crowding or scarcity of food.

LEMNOS was an island in the northern part of the Ægean Sea, now called by the inhabitants Limnos. The Italian form of the name, Stalimene, is not used in the island itself, but is commonly employed in geographical works. The island, which belongs to Turkey, is of considerable size. Pliny says that the coast-line measured 112½ Roman miles, and the area has been estimated at 150 square miles. Great part of it is mountainous, but some very fertile valleys exist, to cultivate which 2,000 yoke of oxen are employed. The hillsides afford pasture for 20,000 sheep. No forests exist on the island; all the wood which is used is brought from the coast of Roumelia or from Thasos. A few mulberry and fruit trees grow, but no olives. The inhabitants number about 22,000, of whom 2,000 are Turks and the rest Greeks. The chief towns are Kastro on the western coast, with a population of 4,000 Greeks and 800 Turks, and Mudros on the southern coast.

LEMON, the fruit of *Citrus Lemonum*, Risso, which is regarded by some botanists as a variety of *Citrus medica*, L. The wild stock of the lemon-tree is a native of the valleys of Kumaon and Sikkim in the Northwest Provinces of India, ascending the mountains to a height of 4,000 feet, and occurring under several forms.

The lemon seems to have been unknown to the ancient Greeks and Romans, and to have been introduced by the Arabs into Spain between the twelfth and thirteenth centuries. In 1494 the fruit was cultivated in the Azores, and largely shipped to England, but since 1838 the exportation has ceased. As a cultivated plant the lemon is now met with throughout the Mediterranean region, in Spain and Portugal, in California and Florida, and in almost all tropical and subtropical countries. Like the apple and pear, it varies exceedingly under cultivation. Risso and Poiteau enumerate forty-seven varieties of this fruit, although they maintain as distinct the sweet lime, *Citrus Limetta*, Risso, with eight varieties, and the sweet lemon, *Citrus Lumia*, Risso, which differ only in the fruit possessing an insipid instead of an acid juice, with twelve varieties.

The lemon is more delicate than the orange, although, according to Humboldt, both require an annual mean temperature of 62° Fahr. Unlike the orange, which presents a fine, close head of deep green foliage, it forms a straggling bush, or small tree, ten to twelve feet high, with paler, more scattered leaves, and short angular branches with sharp spines in the axils. The flowers, which possess a sweet odor quite distinct from that of the orange, are in part hermaphrodite and in part unisexual, the outside of the corolla having a purplish hue. The fruit, which is usually crowned with a nipple, consists of an outer rind or peel, the surface of which is more or less rough from the convex oil receptacles imbedded in it, and of a white inner rind, which is spongy and nearly tasteless, the whole of the interior of the fruit being filled with soft, parenchymatous tissue, divided into about ten to twelve compartments, each generally containing two or three seeds. The white inner rind varies much in thickness in different kinds, but is never so thick as in the citron. As lemons are much more profitable to grow than oranges, on account of their keeping properties, and from their being less liable to injury during voyages, the cultivation of the lemon is preferred in Italy wherever it will succeed.

The lemon-tree is said to be exceedingly fruitful, a large one in Spain or Sicily ripening as many as three thousand fruits in favorable seasons. In the south of Europe lemons are collected more or less during every month of the year, but in Sicily the chief harvest takes place from the end of October to the end of December, those gathered during the last two months of the year being considered the best for keeping purposes. The fruit is gathered while still green.

The Greek island of Andros is said to produce 10,000,000 of lemons annually; these are exported chiefly to Constantinople, the Black Sea, and the Danube. Until recently the United States have been large importers of lemons, at good prices, from the Mediterranean. In 1878 Palermo exported 463,977 boxes of this fruit. Owing to increased facilities for transit, and the hazardous character of the trade, the lemons are now chiefly exported by the proprietors of small plantations, who, in their eagerness to dispose of their stock, glut the market at New York and Philadelphia, and sometimes find the speculation a ruinous one.

For some years past lemons have been extensively cultivated in the south of California, and the new industry will probably affect the Mediterranean trade to a serious extent. Since it was found that, with a little care in the selection of the soil, these trees could be grown throughout the State, they have been planted in immense numbers, and the produce of each tree has been found to bring from $8 to $15. It has been estimated that in a few years the produce will be equal to the requirements of the Pacific States and Territories, and that ultimately the whole of the United States may be supplied with lemons from California. In east Florida also, where suitable land is obtainable at $15 to $20 an acre, lemons, limes, citrons, and more especially oranges, are being raised in abundance. In New South Wales lemons are also grown, having been introduced into Sydney about the year 1790.

LEMONNIER, Pierre Charles, a distinguished astronomer, was born in Paris, November 23, 1715, where his father combined the practice of astronomy with the profession of philosophy. His first recorded observation was made before he was sixteen, and the presentation of an elaborate lunar map procured for him admission to the Academy, April 21, 1736, at the early age of twenty. He was chosen in the same year to accompany Maupertuis and Clairaut on their geodesical expedition to Lapland. In 1738, shortly after his return, he explained, in a memoir read before the Academy, the striking advantages of Flamsteed's mode of determining right ascensions. Indeed his persistent recommendation of English methods and instruments combined with the labors of Lacaille to effect a revolution in French practical astronomy, and constituted the most eminent of his services to science. He corresponded with Bradley, was the first to represent the effects of nutation in the solar tables, and introduced, in 1741, the use of the transit-instrument at the Paris observatory. He visited England in 1748, and in company with the earl of Morton and Short the optician continued his journey to Scotland, where he observed the annular eclipse of July 25th. Among the fruits of his industry may be mentioned a laborious investigation of the disturbances of Jupiter by Saturn, the results of which were employed and confirmed by Euler in his prize essay of 1748; a series of lunar observations extending over fifty years, some interesting researches in terrestrial magnetism and atmospheric electricity, in the latter of which he detected a regular diurnal period; and the determination of the places of a great number of stars, including twelve separate observations of Uranus, between 1765 and its discovery as a planet. In his lectures at the Collége de France he first publicly expounded the analytical theory of gravitation, and his timely patronage secured the services of Lalande for astronomy. He died at Héril near Bayeux, May 13, 1799.

LEMUR, a term applied by Linnæus to a group of mammals, and suggested by the nocturnal habits and strange, ghost-like appearance of some of its members. As they had previously no vernacular appellation in English, it has been generally adopted, and is now completely anglicized, making "lemurs" in the plural. The French call them *Makis*, the Germans *Halbaffen*, in allusion to their forming, in appearance, at least, a transition from monkeys to ordinary quadrupeds. For the same reason they are called *Prosimiæ* by some systematic writers.

The Lemurs, or Lemuroid animals as they ought more properly to be called, were formerly associated with monkeys in the Linnæan order *Primates*, and afterward in the *Quadrumana* of Cuvier, forming in that order the third main division called by Geoffroy St. Hilaire *Strepsirhina*, on account of the twisted form of the external nostrils, a division equivalent in value to the *Catarhina* or Old World and the *Platyrhina* or New World monkeys. As more complete knowledge of their organization has been gradually attained, the interval which separates them structurally from the monkeys has become continually more evident, and they are now considered either as a distinct suborder of the *Primates*, or even as forming an order apart, without any very near affinities with the animals with which they have hitherto been so closely associated.

The existing species are not numerous, and do not diverge widely in their organization or habits, being all of small or moderate size, all adapted to an arboreal life, climbing with ease, and, as they find their living, which consists of fruits, leaves, birds' eggs, small birds, reptiles, and insects, among the branches of the trees, they rarely have occasion to descend to the ground. None are aquatic, and none burrow in the earth. Many of the species, but by no means all, are nocturnal in their habits, spending the day in sleeping in holes, or rolled up in a ball, perched on a horizontal branch, or in the fork of a tree, and seeking their food by night. Their geographical distribution is very peculiar; by far the larger proportion of species, including all those to which the term "lemur" is now especially restricted, are exclusively inhabitants of Madagascar, where they are so abundant and widely distributed that it is said by M. Grandidier, who has contributed more than any other traveler to enrich our knowledge of the structure and manners of these animals, that there is not a little wood in the whole island in which some of them cannot be found. From Madagascar as a center a few species less typical in character extend through the African continent westward as far as Senegambia, and others are found in the Oriental region as far east as the Philippine Islands and Celebes.

LENA. See SIBERIA.

LENCLOS, NINON DE (1615–1705), was the daughter of a gentleman of good position in Touraine. Her long and eventful life divides into two periods, during the former of which she was the typical Frenchwoman of the gayest and most licentious society of the seventeenth century, during the latter the recognized leader of the fashion in Paris, and the friend of wits and poets. Of her earlier life the less said the better, and in her defense all that can be pleaded is that she had been educated by her father in the epicurean and sensual beliefs made popular by Montaigne, and that she retained throughout the frank demeanor and disregard of money which won from Saint Évremond the remark that she was an *honnête homme*. Against her, and the numerous specious defenses set up for her by contemporaneous and subsequent French writers, must be mentioned her absolute want of maternal feeling and even of natural shame. The well-known visit of Queen Christina to her attests the extent of her renown, or infamy, and the inefficacy of the threats of Anne of Austria prove her power. Of a perfectly different character was her later life, when, though she had continued her career of debauchery for a preposterous length of time, she settled down to the social leadership of Paris. Then there were to be found in her salon all that was most witty and refined in France—"ladies as well as gentlemen of the highest birth," remarks a correspondent to Madame de Sevigné, poets like Molière, abbés like Chateauneuf, Genevese preachers like Turretin, the protegé of Saint Évremond. It became the fashion for young men as well as old to throng around her, and the best of all introductions for a young man who wished to make a figure in society was an introduction to Mdlle. de Lenclos. The cause for this surpassing social success is to be found perhaps as much in her past notoriety, and past intimacy with the great names of the last generation, as in the wit and tact to which Saint Évremond, and after him Sainte-Beuve, ascribe it. Her long friendship with Saint Évremond must be briefly noticed. They were of the same age, and had been intimate in their youth, and throughout his long exile the wit seems to have kept a kind remembrance of Ninon. The few really authentic letters of Ninon herself are those addressed to her old friend, and the letters of both in the last few years of their equally long lives are exceptionally touching, and unique in the polite compliments with which they try to keep off old age. If Ninon owes part of her posthumous fame to the old wit, she owes at least as much to the young Arouet, who was presented to her as a promising boy poet by the Abbé de Chateauneuf, to whom she left 2,000 francs to buy books, and who, as Voltaire, was to write a letter on her which was to be the chief authority of many subsequent biographers. Her personal appearance is, according to Sainte-Beuve, best described in a novel of Mdlle. de Scudery, and the characteristic of it was neither beauty nor wit, but high spirits, and perfect evenness of temperament.

LENFANT, JACQUES (1661–1728), author of numerous works, chiefly in ecclesiastical history, was born at Bazoche (Eure-et-Loir), France.

LENKORAN, a town in Trans-Caucasia, on the Caspian, at the mouth of a small stream of its own name, and close to a great lagoon. Taken by storm on New Year's day, 1813, by General Kotliareski, Lenkoran was in the same year surrendered by Persia to Russia by the treaty of Gulistan along with the khanate of Talysh, of which it was the capital. In 1867 it had a population of 15,933; but according to the census of 1893 there were only 5,779 inhabitants (734 Russians, 232 Armenians).

The district of Lenkoran (2,078 square miles), corresponding to the khanate of Talysh, is highly interesting from its physical peculiarities. It is a thickly wooded, mountainous region, shut off from the dry Persian plateau by the Talysh range, and with a narrow marshy strip along the coast. The climate is exceptionally moist and warm, and fosters the growth of even Indian forms of vegetation. The iron-tree, the silk acacia, the box-tree, and the walnut flourish freely, as well as the sumach, the pomegranate, and the *Gleditchia caspica*. The Bengal tiger is not infrequently met with, and wild boars are abundant. Of the 95,482 inhabitants of Lenkoran, the Talyshians (42,999) form the most interesting and aboriginal element, belonging as they do to the Iranian family, and speaking an independently developed language closely related to Persian.

LENNEP, a small town of Rhenish Prussia in the district of Düsseldorf, is situated eighteen miles east of Düsseldorf and nine miles south of Barmen. Population, 9,000.

LENNEP, JACOB VAN (1802–1868), Dutch poet and novelist, was born at Amsterdam.

LENT, the ecclesiastical season known in the Latin Church, from at least the fourth century, as *Quadragesima*. Irenæus, in a passage which, though not free from difficulties, is yet clear enough in its general scope, mentions that the custom of keeping a fast before

Easter Sunday was quite old even in his day, but that no uniformity of observance had up to that time been established, some thinking they ought to fast for one day, others for two days, and others having further peculiarities. In Tertullian's day the Good Friday fast at all events was general, and elsewhere he indicates his opinion that Christians ought to commemorate by a religious fast all the time during which "the bridegroom was taken away from them." This period of fasting was gradually extended, but still without uniformity of praxis. As regards the manner of observing Lent, various degrees of strictness have prevailed in the church. Perfect abstinence from all food every fasting day until evening is in theory at least required, and it has also been considered desirable that public worship with sermon should be attended daily, with frequent communion, especially on Saturday and Sunday; public amusements, especially stage plays, are prohibited, and the celebration of religious festivals, as also of birthdays and marriages, is held to be unsuitable; and increased diligence in almsgiving and deeds of charity is enjoined.

In the Roman Catholic, Greek, and Episcopal churches Lent is observed. It covers the forty days from Ash Wednesday to Easter Eve, and is considered as a time during which certain worldly practices are to be intermitted.

LENTIL, the seed of *Lens esculenta*, a small annual of the vetch tribe. The plant varies from six to eighteen inches in height, and has many long ascending branches. The pods are about one-half inch long, broadly oblong, slightly inflated, and contain two seeds, which are of the shape of a doubly convex lens, and about one-sixth inch in diameter. There are several cultivated varieties of the plant, differing in size, hairiness, and color of the leaves, flowers and seeds. The last may be more or less compressed in shape, and in color may vary from yellow or gray to dark brown; they are also sometimes mottled or speckled. In English commerce two kinds only of lentils are principally met with, viz., the French and the Egyptian. The former are usually vended entire, and are of an ash-gray color externally and of a yellow tint within. Egyptian lentils are chiefly imported from Alexandria. Considerable quantities of lentils are also imported into the United States, and are chiefly consumed by the Germans, with whom lentil soup is a favorite dish. The native country of the lentil is not known, although it is supposed to be indigenous to the Himalayas. It was probably one of the first plants brought under cultivation by mankind.

LENTINI. See LEONTINI.

LEO I., who alone of Roman pontiffs shares with Gregory I. the surname of THE GREAT, pope from 440 to 461, was a native of Rome, or, according to a less probable account, of Voltarra in Tuscany. Of his family or of his early education nothing is known; that he was highly cultivated according to the standards of his time is obvious, but it does not appear that he could write Greek, or even that he understood that language. No certain traces of his early ecclesiastical career have been discovered. In 429, when the first unmistakable reference to Pope Leo occurs, he was still only a deacon, but already a man of commanding influence. In 440, while Leo was in Gaul, whither he had been sent to compose some differences between Aetius and another general named Albinus, Pope Sixtus III. died, and the absent deacon, or rather archdeacon, was forthwith unanimously chosen to succeed him, and received consecration on his return six weeks afterward (September 29th). Among the reasons urged by Leo for holding a council in Italy had been the threatening attitude of the Huns; the dreaded irruption took place in the following year (452). After Aquileia had succumbed to Attila's long siege, the conqueror set out for Rome. Near the confluence of the Mincio and the Po he was met by Leo, whose eloquence persuaded him to turn back. Legend has sought to enhance the impressiveness of the occurrence by an unnecessarily imagined miracle. The pope was less successful with Genseric when the Vandal chief arrived under the walls of Rome in 455, but he secured a promise that there should be no incendiarism or murder, and that three of the oldest basilicas should be exempt from plunder—a promise which seems to have been faithfully observed. The death of Leo occurred in 461.

LEO II., pope from August, 682, to July, 683, was a Sicilian by birth, and succeeded Agatho I. Benedict II. followed him.

LEO III., whose pontificate (795–816) covered the last eighteen years of the reign of Charlemagne, was a native of Rome, and having been unanimously chosen successor of Adrian I. on December 26, 795, was consecrated to the office on the following day. His first act was to send Charles as patrician the standard of Rome along with the keys of the sepulcher of St. Peter, and of the city; a gracious and condescending letter in reply made it still more clear where all real power at that moment lay. He died in 816. Leo's successor was Stephen IV.

LEO IV., pope from 847 to 855, was a Roman by birth, and was unanimously chosen to succeed Sergius II. His pontificate was chiefly distinguished by his efforts to repair the damage done by the Saracens during the reign of his predecessor to various churches of the city, especially those of St. Peter and St. Paul. Benedict III. was Leo's immediate successor.

LEO V., a native of Ardea, was pope for some thirty days in 903 after the death of Benedict IV. He was succeeded by Sergius III.

LEO VI. succeeded John X. in 928, and reigned seven months and a few days. He was succeeded by Stephen VIII.

LEO VII., pope from 936 to 939, was preceded by John XI., and followed by Stephen IX.

LEO VIII., pope from 963 to 965, a Roman by birth, held the lay office of "protoscrinius" when he was elected to the papal chair at the instance of Otho the Great, by the Roman synod which deposed John XII. in December, 963. Having been hurried with unseemly haste through all the intermediate orders, he received consecration two days after his election, which was unacceptable to the people. In February, 964, the emperor having withdrawn from the city, Leo found it necessary to seek safety in flight, whereupon he was deposed by a synod held under the presidency of John XII. Leo VIII. was succeeded by John XIII.

LEO IX., pope from 1049 to 1054, was a native of Upper Alsace, where he was born June 21, 1002. His proper name was Bruno; the family to which he belonged was of noble rank, and, through his father, he was related to the emperor Conrad II. He was educated at Toul, where he successively became canon and (1026) bishop; in the latter capacity he rendered important political services to his relative Conrad II., and afterward to Henry III., and at the same time he became widely known as an earnest and reforming ecclesiastic by the zeal he showed in spreading the rule of the order of Cluny. On the death of Damasus II., Bruno was, in December, 1048, with the concurrence both of the emperor and of the Roman delegates, selected his successor by an assembly at Worms; he stipulated, however, as a condition of his acceptance, that he should first proceed to Rome and be canonically elected by the voice of clergy and people. At Besançon he was joined by the young monk Hildebrand, who afterward became Pope Gregory VII.; arriving in pilgrim garb at Rome in the following February, he was received with much cordiality, and at his consecration assumed the name of Leo IX. One of his first public acts was to hold the well-known Easter synod of 1049, at which celibacy of the clergy (down to the rank of subdeacon) was anew enjoined, and where he at least succeeded in making clear how strongly his own convictions went against every kind of simony. The greater part of the year that followed was occupied in one of those progresses through Italy, Germany, and France which form so marked a feature in Leo's pontificate. After presiding over a synod at Pavia, he joined the emperor Henry III. in Saxony, and accompanied him to Cologne and Aix-la-Chapelle; to Rheims he also summoned a meeting of the higher clergy, which, although there were many abstentions, was largely attended, and by which several important reforming decrees were passed. At Mainz also he held a council, at which the Italian and French as well as the German clergy were represented, and ambassadors of the Greek emperor were present; here, too, simony and the marriage of the clergy were the principal matters dealt with. After his return to Rome he held (April 29, 1050) another Easter synod. He next joined the emperor at Pressburg, and vainly sought to secure the submission of the Hungarians; at Ratisbon, Bamberg, and Worms the papal presence was marked by various ecclesiastical solemnities; but at Mainz, in a dispute about the ordination of a deacon between the archbishop and the pope, the latter had to give way. After a fourth Easter synod in 1053, Leo set out against the Normans in the south with an army of Italians and German volunteers, but the forces sustained a total defeat at Astagnum, near Civitella (June 18, 1053); on going out, however, from the city to meet the enemy, he was received with every token of submission, relief from the pressure of his ban was implored, and fidelity and homage were sworn. From June, 1053, to March, 1054, he was nevertheless detained at Benevento in honorable captivity; he did not long survive his return to Rome, where he died on April 19, 1054. He was succeeded by Victor II.

LEO X. (Giovanni de' Medici, 1475–1523), the only pope who has bestowed his own name upon his age, and one of the few whose original extraction has corresponded in some measure with the splendor of the pontifical dignity, was the second son of Lorenzo de' Medici, called the Magnificent, and was born at Florence, December 11, 1475. Like his contemporary Henry VIII., he was from the first destined for the ecclesiastical condition; he received the tonsure at seven, held benefices at eight, and ere he was thirteen negotiations were in active progress for his elevation to the cardinalate. Innocent VIII., the reigning pope, was bound to Lorenzo by domestic ties and a common policy and interest; in October, 1488, Giovanni was created a cardinal under the condition that he should not be publicly recognized as such for three years. The interval was devoted to the study of theology and canon law, pursuits less congenial to the young prince of the church than the elegant literature for which he inherited his father's taste, and in which he had already made great progress under the tuition of Politian and Bibbiena. In March, 1492, he was formally admitted into the sacred college, and took up his residence in Rome. One of the first consequences of the French irruption into Italy, which shortly ensued, was the expulsion of the Medici family from Florence (November, 1494). After having resisted to the best of his ability, the Cardinal de' Medici found a refuge at Bologna, and, seeing himself deprived for the time of political importance, and obnoxious to Innocent's successor, Alexander VI., undertook a journey in foreign countries with a party of friends. Upon his return he settled at Rome, withdrawing himself from notice as much as possible, and disarming the jealousy of Alexander by his unaffected devotion to literary pursuits. The accession of Julius II., and the death of his elder brother Piero in the battle of the Garigliano (December, 1503), restored him to consequence; but little is recorded of him until 1511, when Julius appointed him legate at Bologna, an office which gave him the nominal direction of the combined Spanish and papal army then besieging that city. The siege failed, and two months afterward the allies were totally defeated by the French under Gaston de Foix in the famous battle of Ravenna (April 11, 1512), and the Cardinal de' Medici himself was taken prisoner. The French victory produced none of the anticipated results; within a short time the conquerors were even obliged to evacuate Milan, carrying their captive with them. In the confusion of the retreat the cardinal effected his escape, and fled to Mantua. Being reappointed to his legation, he took quiet possession of Bologna; within a few months his family were restored to Florence by the Spanish and papal troops, and the death of Julius II., on February 21, 1513, raised him most unexpectedly to the papacy on March 11th following, at the age of only thirty-seven years. It seems difficult to assign any adequate reason for an election so contrary to traditional observance and the private interests of all the more conspicuous members of the conclave; but it has never been attributed to simony. The new pope assumed the name of Leo X.

Scarcely had he ascended the pontifical throne when the storm burst in the shape of a determined effort of the French king to repossess himself of the duchy of Milan. An army of Swiss, called into the field by Leo's diplomacy, repelled the invasion, and Italy enjoyed peace until the death of Louis XII., two years subsequently, brought to the throne a young prince who only lived for military glory, and whose entire reign was dominated by the ambition of recovering Milan and Naples. On September 13, 1515, Francis I. totally defeated the Swiss at Marignano. One of the first consequences of the battle, which reduced Leo to submission by placing the Medici in Florence at the mercy of the victor, was the loss of Parma and Piacenza. These duchies, but recently acquired by Julius II., were reunited to Milan, and Leo, temporizing in the true spirit of Italian statecraft, consented to a public interview with Francis, and became apparently his ally. Little as the pope's professions were to be depended upon, Francis thus gained the substantial advantage of a concordat seriously restricting the liberties of the Church of France. After a severe struggle, however, Leo's arms triumphed for the time, but the undertaking proved as injurious to his credit as to his exchequer, and the financial exhaustion which it occasioned helped to prepare the great disaster of his reign. Another unfortunate occurrence of this period was a plot of several cardinals to poison the pope, which led to the execution of one and imprisonment of several others. This conspiracy probably made Leo distrustful of the sacred college as then constituted, and led to one of the most remarkable acts of his pontificate, the creation of thirty-one cardinals in a single day. This dangerous stretch of authority made him absolute master in his own court for the remainder of his reign, and it must be admitted that most of the new cardinals were men of distinguished merit. A much more momentous event was now at hand, which, however, belongs more properly to the biography of Luther than to that of Leo. On All Saints' eve, 1517, the daring protest of Luther against the intolerable impostures and rapacity of the papal venders of indulgences, commissioned by Leo to raise money for the rebuilding of St. Peter's, gave the signal for the Reformation. Leo was at first amused. When at length his eyes were opened he followed the policy of mingled menace and cajolery which was alone possible where the secular arm was unavailable, and which might probably have succeeded with a man of different mold from Luther. By 1520 the breach had become irreparable, and an invincible fatality had linked the name of the most ostentatious of the popes with the profoundest humiliation of the church.

Leo died before the full extent of the calamity was apparent, and amid a full tide of political prosperity which would have easily consoled him for the diminution of his spiritual prerogatives.

LEO XI. (Alessandro de' Medici) was chosen under French influence, to succeed Clement VIII. as pope on April 1, 1605, and died on April 27th of the same year. His successor was Paul V.

LEO XII. (Annibale della Genga), pope from 1823 to 1829, a native of Romagna, was born on August 22, 1760. In 1790 he first gained public recognition of his talents by the success with which he accomplished the delicate task laid upon him by Pius VI. of pronouncing a funeral discourse over the emperor Joseph II.; in 1793 he was sent as nuncio to Lucerne with the title of archbishop of Tyre; in the following year he went, also as a nuncio, to Cologne; in 1805 he attended the diet of Ratisbon as papal plenipotentiary; and in 1808 he shared with Caprara a difficult mission to France. Some years of retirement at the abbey of Monticelli now followed; but in 1814 he was made the bearer of the pope's congratulations to Louis XVIII.; in 1816 he became cardinal priest of Sta. Maria Maggiore, receiving also the bishopric of Sinigaglia, while in 1820 he became cardinal vicarius. On September 28, 1823, he was chosen to fill the vacancy caused by the death of Pius VII.; at the time it was believed that he had not long to live, and, in point of fact, on the 23d day of the following December his condition became so serious that the last sacraments were administered to him; suddenly, however, he recovered. Throughout his pontificate Leo showed himself a man of simple tastes and laborious habits; his diplomatic relations with the European powers were on the whole characterized by firmness, tact, and moderation, and perhaps the most unfavorable criticism to be made upon his domestic policy is that it was unpractical in its meddlesomeness and unstatesmanlike in its severity. He died on February 10, 1829, and was succeeded by Pius VIII.

LEO I., FLAVIUS, surnamed MAGNUS and THRAX, emperor of the East, was born about 400 A.D., in the country of the Bessi, Thrace, and succeeded Marcian in February, 457. At the time of his elevation he was an obscure military tribune, but had become steward to Aspar, patrician and commander of the guards, who might himself have aspired to the purple had he not been tainted with the Arian heresy.

In 468, Leo, in concert with Anthemius, whom, in the intervening year, he had caused to be made emperor of the West, equipped a naval armament against the Vandals of Africa, who, under Genseric, had long been the scourge of Italy and the Mediterranean. The large fleet of more than one thousand vessels was intrusted to the command of Leo's brother-in-law, Basiliscus, who, after a prosperous passage, disembarked his troops safely at Cape Bona, within forty miles of Carthage, but weakly granted a truce of five days to the enemy; during the interval, favored by the wind and the darkness of the night, the fleet of Genseric, with several fireships in tow, attacked the Roman vessels, burning and sinking one-half of them, and thus causing the entire failure of the expedition. A widespread belief that the Arian Aspar had, somehow, helped to bring about this disastrous defeat, furnished Leo with a pretext for getting rid of this dangerous kingmaker, who, accordingly, was treacherously put to death, along with one of his sons, in 471. To avenge (as they alleged) the murder, the Goths invaded Thrace, and ravaged the country almost to the walls of the capital. In October, 473, Leo associated with himself his child grandson, Leo II., and in the following year he died (February 3, 474); his successor survived him for a few months only. The somewhat misleading surname of Great borne by Leo I. is due solely to the obsequious gratitude of the orthodox party; by the Arians he was, not without some show of justice, nicknamed Macellarius ("butcher").

LEO III., FLAVIUS, surnamed THE ISAURIAN, a native of Isauria, born about 680, was originally called Conon, a name which he dropped after he had risen to military distinction. In 713 he received from Anastasius II. the command of the eastern army; and, when that emperor was deposed by Theodosius III. in 716, Leo, marching to Constantinople, compelled the usurper to resign, and was himself made emperor amid much popular enthusiasm in March, 718. The internal troubles of the empire had meanwhile permitted the advance of the Arabs, who in large numbers invested the capital by land and sea in the following August; the siege was not raised till 720. Relieved from this pressing danger, and also, in 721, from a conspiracy originating with the deposed emperor Anastasius II., Leo speedily inaugurated the aggressive religious policy with which his name is associated, by promulgating, in 722, the edicts commanding the baptism of Jews and Montanists throughout the empire, and in 726 that against the "idolatry of image worship," which was destined ultimately to produce so important effects on the relations of Italy and the West with Byzantium. The closing years of Leo's reign were disturbed by troubles with the Arabs; and 740 was made memorable by a great earthquake which devastated Constantinople, Thrace, and Bithynia. He died in 741.

LEO V., FLAVIUS, surnamed THE ARMENIAN, served as general under Nicephorus I., but was banished for treachery in 811. Shortly afterward he was recalled and appointed commander of the eastern army by Michael I. After gaining some distinction in war with the Arabs in 812, he accompanied his sovereign, in 813, on an expedition against Crum, king of the Bulgarians. Taking advantage of the disaffection of the army during a battle with the enemy near Adrianople, he withdrew with the forces under his command, leaving Michael to total defeat. Shortly afterward he was crowned at Constantinople without opposition (813). In 814, and again in the following year, he inflicted decisive defeats upon the Bulgarians. He then began to show great zeal against the image worshipers; but such was his severity that even his closest friend, Michael the Stammerer, who had done much to help him to the throne, ultimately turned against him. Michael was convicted of conspiracy and condemned to death, but by the intervention of his friends, who assassinated Leo in the palace chapel on Christmas Eve, 820, was raised from prison to the throne.

LEO VI., FLAVIUS, surnamed SAPIENS and PHILOSOPHUS, succeeded his father, Basil I., in 886, and died in 911.

LEO, JOHANNES, usually called LEO AFRICANUS, sometimes ELIBERITANUS (*i.e.*, of Granada), is best known as the author of a valuable *Africæ Descriptio*, which long ranked as almost the only authority in regard more especially to the Sudan. Born probably at Granada, of a noble Moorish stock, Alhasan ibn Mohammed Abwazzan Alfasi (for this was his real designation) received an excellent education at Fez, where his family settled after the expulsion from Spain. He was still in his sixteenth year when he began a course of travel which extended, not only through the northern and central parts of Africa (where he had advanced to the southeast of Lake Chad), but also into Arabia, Syria, Persia, Armenia, Tartary, and portions of Europe. As he was returning from Egypt about 1517, he was captured by pirates near the island of Gerba, and he was ultimately presented as a slave to Leo X. The pope no sooner discovered what manner of man he was than he assigned him a pension; and having persuaded him to profess the Christian faith, he stood sponsor at his baptism, and bestowed on him his own name, Johannes and Leo. The new convert, having made himself acquainted with Latin and Italian, not only taught Arabic to Ægidius Antonius, bishop of Viterbo, and others, but wrote books in both tongues. He appears to have returned to Africa, and to have put off his Christianity, before his death; but the latter part of his career is involved in obscurity. He was still alive in 1526.

LEOBSCHÜTZ, a town in the Prussian province of Silesia, circle of Oppeln, is situated on the Zinna, about twenty miles to the northwest of Ratibor. Population, 12,015.

LEOCHARES, one of the sculptors of the younger Attic school in the fine period of Greek art. He is called a young man in a pseudo-Platonic epistle which must be later than 366 B.C. He worked on the Mausoleum along with Scopas, Bryaxis, Timotheus, and Pythis about 356 B.C.; the west side of the frieze, of which all the extant fragments are in the British Museum, was intrusted to him. He made the statue of Isocrates which was erected at Athens about 354 B.C. Many other portrait statues are known to have been his work.

LEOMINSTER, a municipal and parliamentary borough and market-town of England, in the county of Hereford, is situated in a rich agricultural country on the Lug, 150 miles west-northwest of London, and twelve north of Hereford. Pop. (1901), about 8,000.

LEOMINSTER, a post-town of Worcester county, Mass., fifty-four miles from Boston, is a busy manufacturing place, with a pop. (1900) of 12,392. It contains one national and one savings bank, six churches, several good public schools, a high school, and a public library.

LEON, one of the forty-nine provinces of Spain, is bounded on the north by Oviedo, on the east by Valencia, on the south by Valladolid and Zamora, and on the west by Orense and Lugo, and has an area of 6,166 square miles, with a pop. (1898) of 385,000. Its boundaries on the north and west, formed respectively by the central ridge and southerly offshoots of the great Cantabrian chain, are strongly marked; toward the southeast it merges imperceptibly into the Castilian plateau, the line of demarkation being, for the most part, merely conventional. It belongs partly to the Miño and partly to the Duero river system, these being separated by the montañas de Leon, which extend in a continuous wall (with passes at Manzanal and Poncebadon) from north to southwest.

LEON, the capital of the above province, is pleasantly situated upon a rising ground in the angle formed by the Torio and Bernesga, which here unite to form the Leon, a tributary of the Esla; its distance northwest from Madrid is 258 miles. The town, which is surrounded by old and dilapidated walls, everywhere presents an aspect of ruin and decay. The population in 1898 was 15,000.

LEON, a city of Mexico, in the State of Guanajuato, the chief town of a department, and in population second only to the capital of the republic, from which it is distant about 100 miles. It is situated on the right bank of the Rio Torbio, in the midst of a fertile and flourishing region, and is altogether one of the best built and most prosperous places in the country, with a large trade in grain and other agricultural produce, and a number of considerable industries — cotton and woolen weaving, tanning, and saddlery. For some time Leon has aspired to become the chief town of a new State, and even to take the place of Mexico as the national capital. The opening of the railways southeast to Mexico and northeast to the Rio Grande will further stimulate its development. The foundation of Leon dates from 1576, and it has ranked as a city since 1836, but the beginning of its present prosperity belongs to recent years. Pop. (1899), 60,000.

LEON, the chief city of a department of the same name in the republic of Nicaragua, situated in an extensive plain about midway between the great inland lake of Nicaragua and the Pacific Ocean. It is connected by rail with Corinto on the coast (which has taken the place of Realejo, its former port); and the line is being extended to Leon Viejo on Lake Managua and thence to Granada. The city is spread over so wide an area that Squier, after a three months' residence, found himself discovering new and secluded portions. Its public buildings are among the finest of Central America. The cathedral (1746–1774) is a strong piece of masonry, with a roof of massive arches, which has several times been used as a fortress during the civil wars. The old episcopal palace (1678), the new episcopal palace (1873), and the college of St. Ramon (1678) also deserve to be mentioned. The population is estimated (1900) at 46,000.

LEON, LUIS PONCE DE (1528–1591), usually known as Fray Luis de Leon, Spanish religious writer, was born, most probably, at Granada. It is chiefly as a poet that Fray Luis de Leon is now remembered and admitted to a high place among the classic authors of Spain.

LEONARDO (or LIONARDO) DA VINCI was born in 1452 and died in 1519, having, during his life, excelled in almost every honorable human attainment and pursuit, the commercial and political excepted. Considering the range of his speculative as well as that of his practical powers, he seems certainly the man whose genius has the best right to be called universal of any that have ever lived. In the fine arts, he was the most accomplished painter of his generation and one of the most accomplished of the world, a distinguished sculptor, architect and musician, and a luminous and pregnant critic. In inventions and experimental philosophy, he was a great mechanician and engineer, an anatomist, a botanist, a physiologist, an astronomer, a chemist, a geologist, and geographer—an insatiable and successful explorer, in a word, along the whole range of the physical and mathematical sciences when most of those sciences were new. Unfortunately he paid the penalty of his universality. The multifariousness and the equal balance of his faculties caused him to labor promiscuously in all fields of effort. He set himself to perform tasks and to solve problems too arduous and too manifold for the strength of any single life. The consequence was that in art he was able to carry few undertakings to completion, and in science to bring no fully matured researches to the light.

The man thus extraordinarily gifted was the son of a Florentine lawyer, born out of wedlock by a peasant mother. The place of his birth was Vinci, a "castle" or fortified village in the Florentine territory near

Empoli, from which his father's family derived its name. The Christian name of his father was Piero (the son of Antonio the son of Piero the son of Guido, all of whom had been men of law like their descendant). Leonardo's mother was called Caterina. Her relations with Ser Piero da Vinci seem to have come to an end almost immediately upon the birth of their son. She was soon afterward married in her own rank of life. Ser Piero on his part was four times married, and had by his last two wives nine sons and two daughters; but the boy Leonardo had from the first been acknowledged by his father, who brought him up in his own house, principally, no doubt, at Florence.

Verrocchio, as is well known, although not one of the great creative or inventive forces in the art of this age at Florence, was a thoroughly capable and spirited craftsman alike as goldsmith, sculptor, and painter, while in teaching he was particularly distinguished. In his studio Leonardo worked for several years in the company of Lorenzo di Credi and other less celebrated pupils. He had soon learned all that his master had to teach—more than all, if we are to believe the oft-told tale of the figure, or figures, executed by the pupil in the picture of *Christ's Baptism* designed by the master for the monks of Vallambrosa. The work in question is now in the Academy at Florence. According to Vasari the angel kneeling on the left, with a drapery over its right arm, was put in by Leonardo, and when Verrocchio saw it his sense of its superiority to his own work caused him to forswear painting forever after. The latter part of the story is certainly false. Moreover, a closer examination seems to detect the hand of Leonardo, not only in the figure of the angel, but also in that of Christ and in the landscape background, which are designed with extreme refinement, and painted in the new medium of oil, while the remainder of the picture has been executed by Verrocchio in his accustomed vehicle of tempera. The work was probably produced between 1480 and 1482, when Leonardo was from eighteen to twenty years of age. By the latter date we find him enrolled in the lists of the painters' guild at Florence. Here he continued to live and work probably for eight or nine years longer. Up till 1477 he is still spoken of as a pupil or apprentice of Verrocchio; but in 1478 he receives an independent commission from the signory, and in 1480 another from the monks of San Donato in Scopeto. He had in the meanwhile been taken into special favor by Lorenzo the Magnificent.

The interval between 1480 and 1487 is one during which the movements of our master are obscure, and can only be told conjecturally. Up to the former date we know with certainty that he was working at Florence, under the patronage of Lorenzo de' Medici. By the latter date he had definitely passed into the service of Duke Ludovico Sforza, called il Moro at Milan. From this time for the next fourteen or fifteen years (until the summer of 1499) Leonardo continued, with very brief intervals of absence, to reside in high favor and continual employment at the court of Ludovico il Moro. His occupations were as manifold as his capacities. He superintended the construction of military engines, and seems to have been occasionally present at sieges and on campaigns. He devised and carried out works of irrigation and other engineering schemes in the territory of the duchy. He designed a cupola for the cathedral of Milan, and was consulted on the works of Certosa of Pavia. He managed with ingenuity and splendor the masques, pageants, and ceremonial shows and festivals of the court. Withal he continued incessantly to accumulate observations and speculations in natural philosophy, working especially at anatomy with Mercantonio della Torre, and at geometry and optics with Fra Luca Pacioli, for whose book *De Divina Proportione* he designed the figures. He made excursions into the Alps, and studied and drew with minute fidelity the distribution and formation of the mountain masses. He was placed at the head of a school or "academy" of arts and sciences, where he gathered about him a number of distinguished colleagues and eager disciples. His pupils in painting included the sons of several noble families of the city and territory.

Leonardo's own chief undertakings in art during his residence at the court of Ludovico il Moro were two in number, namely, the equestrian monument of Francesco Sforza and the mural painting of the *Last Supper*. Leonardo had finished his *Last Supper* between 1497 and 1499. In the spring of the latter year we find that he received, in consideration of payments due, the gift of a vineyard outside the city. Within a month or two his patron had fallen. Milan was taken and held in hostile occupation by the French. A contemporary historian has related with what admiration the invading monarch, Louis XII., when he entered the refectory of Sta. Maria delle Grazie, fixed his gaze on the work of Leonardo, and how he desired, were it possible, that it should be transported across the Alps to France. But by this time or soon afterward the painter himself had left Milan. In the spring of 1500 we hear of him working at Venice, where, among other things, he painted (not, it appears, from life) a portrait of Isabella Gonzaga, marchioness of Mantua. Between the beginning of 1502 and the catastrophe which overtook the house of Borgia in the summer of 1503, Leonardo traveled as engineer in the employ of Duke Cæsar over a great part of Central Italy. His excursions seem to have come to an end early in 1503, as by March of that year we find him once more in Florence.

To the period of three years' wandering which followed Leonardo's departure from Milan there ensued another period of three years, during which he lived a settled life at Florence. He was now fifty-one years of age, and the most famous artist of Italy, though within a year or two the young Michelangelo was destined to challenge his supremacy, and the still younger Raphael to apprehend and assimilate the secrets of his skill, as he did those of the skill of every great predecessor and every distinguished rival in succession. The first important commission put into Leonardo's hands at Florence was that for an altar-piece for the church of the Servite monks (Santa Maria dell' Annunziata). The work had been already intrusted to Filippino Lippi, who had even made some beginning with it, but willingly gave up his claim in favor of his illustrious fellow-citizen. The monks undertook to lodge and nourish Leonardo in their convent while he carried on the work. After long premeditation he began, and prepared that admirable cartoon in black chalk which is now the treasured possession of the Royal Academy in London. When the cartoon was finished and exhibited, all Florence came flocking in delight to see and praise it. Between fastidiousness and preoccupation Leonardo, however, carried the undertaking no farther, and the work was put once more into the hands of Filippino Lippi, and on his death into those of Perugino. Leonardo's next great enterprise at Florence was a historical painting for the Palace of the Signory.

He chose the moment of a terrific struggle for the colors between the opposing sides; hence the work became known in the history of art as the Battle of the Standard. Judging by the accounts of those who saw it, the tumultuous entanglement of men and horses, and the expressions of martial fury and despair, must in this case have been combined and rendered with a mastery not less commanding than had been the looks and gestures of soul's perplexity and dismay among the peaceful company on the convent wall of Milan. Leonardo had finished his cartoon in less than two years (1504–1505), and when it was exhibited along with that of Michelangelo, the two rival works seemed to all men a new revelation of the powers of art, and served as a model and example to the students of that generation, as the frescoes of Masaccio in the Carmine had served to those of two generations earlier. The young Raphael is well known to have been one of those who profited by what they saw. During the years between 1500 and 1505 Leonardo was also engaged at intervals upon the portraits of two ladies of the city—Ginevra Benci, and Lisa di Antonio Maria di Noldo Gherardina, the wife of Zanobi del Giocondo, commonly called *Mona* (*i. e.*, Madonna) *Lisa* or *la Gioconda.* The first of these portraits is lost; the second was bought by Francis I. for 4,000 gold florins and is now one of the glories of the Louvre. Leonardo returned to Milan with leave obtained from the signory and attended by his faithful Salai, in the summer of 1506. For nearly nine years after that he seems to have made the Lombard city his principal home, residing sometimes on his own vineyard and sometimes in the villa of a wealthy young friend and disciple, Francesco Melzi. The French remained in occupation at Milan until 1513, and Leonardo held the title of court painter and engineer to the French king Louis XII., the transfer of his services having been formally requested by that monarch from the Florentine signory.

A great change took place in the affairs of Milan at the close of the year 1512. The French supremacy came to an end, and Maximilian Sforza, the son of Ludovico, returned for a few years to rule over the reduced dominions of his father. All affairs were thrown into confusion, and Milan ceased to be a desirable place of abode for Leonardo and his scholars. In the meantime Giovanni de' Medici, the son of the painter's ancient patron Lorenzo, was elected pope under the title of Leo X., and continued with still greater magnificence the encouragement of art and artists of which his warlike predecessor Julius had set the example. On September 24, 1514, Leonardo, too, set out for Rome from Milan with a company of his pupils. The youngest brother of the pope, Giuliano de' Medici, was his friend, but it is not true that Leonardo, as Vasari says, had accompanied Giuliano to Rome on the occasion of his brother's elevation to the papal chair. Ill-success attended the now aging master during his stay in the shadow of St. Peter's, and he seems, while he was at Rome, to have painted nothing but two small panels, one of a child, the other of a Madonna, for an official of the papal court.

By the end of the year 1515 Leonardo had left Rome and returned once more to Milan. In the meantime the brief rule of Maximilian Sforza had been terminated by the victory at Marignano of Francis I., who prevailed on Leonardo, by this time in his sixty-fourth year, to enter his service and return with him to France. It was in the beginning of 1516 that the painter crossed the Alps, taking with him his friend, the youthful Francesco Melzi. The Château Cloux in Touraine, near Amboise, was appointed for his place of residence. But his race was nearly run. In France he projected some canal works, and painted two pictures of classical mythology, which have been lost, a Leda and a Pomona; and that was all. He desired to put in order some of his vast accumulations of MS. notes and researches, but soon discovered that he who had been endeavoring so insatiably for all these years, in his own words, to learn to live had only been learning to die. That form of strength and beauty, and that exquisitely shaping and all-searching mind, were dissolved before decay or infirmity impaired them. Leonardo died at Cloux, in the sixty-seventh year of his age, on May 2, 1519.

LEONIDAS ("Son of the Lion") was a very common Greek name. The most famous person who bore it was a king of Sparta, seventeenth of the Agid line. He had been king for one year when Xerxes invaded Greece, 480 B.C. The congress of the Greek states, bent on resistance, which met at the isthmus of Corinth, sent Leonidas with a force of at least 8,000 men to hold the narrow pass of Thermopylæ against the Persians (see GREECE). When the Persians, through the treacherous aid of Ephialtes, had turned the pass, Leonidas dismissed all his army except the 300 Spartan citizens, 700 Thespians, and the Theban contingent, which was suspected of treachery. Every man of the Lacedæmonians and Thespians died on the field, while the Thebans laid down their arms. A monument was erected on the spot where the Greeks made their final struggle. It was a lion, and we may compare with it the lion set up by the Thebans on the battlefield of Chæronea to commemorate the sacred band who were all slain there 338 B.C. There is no foundation for the common story that Leonidas had only 300 men with him at Thermopylæ.

LEONTINI, a town in the southeast of Sicily, was founded by the Chalcidians from Naxos, (730 B.C.) Its history is so interwoven with that of its more powerful neighbor Syracuse that it can hardly be treated separately. The people of Leontini were more than once transferred to Syracuse, but the town was always refounded.

LEOPARD, a name now commonly given to a well-known animal, called pard or panther by the ancients. Leopard (*leo-pardus*) was a later term, originally applied, it is believed, to the animal now known as the cheetah or hunting leopard, upon the supposition that it was a creature intermediate between the lion and the true pard. If so it has been completely transferred to the more common species, and though in this sense a perfectly unnecessary and unmeaning term, has gradually superseded those by which this was originally known. Pard, so commonly used by Elizabethan authors, is now nearly obsolete in the English language, and panther has either become synonymous with leopard, or is used vaguely for any similar large feline animal, even the puma of America.

Treating the species as one, it is the *Felis pardus*, Linn., of most systematic authors, belonging to the family *Felidæ* (for the characters of which see MAMMALIA), and is one of the most typical members of the genus *Felis*, both in its structure and habits. It belongs to that section of the genus (which includes most of its larger members, as the lion and the tiger) in which the hyoid bone is loosely connected with the skull, owing to imperfect ossification of its anterior arch, and in which the pupil of the eye when contracted under the influence of light is circular, not linear as in the smaller cats. The teeth consist on each side of three small incisors, and a formidable large, conical, sharp-pointed canine above and below, and three premolars and one molar above, and two premolars and one molar below, all except the very small upper true molar with sharp compressed trenchant crowns. The skull can scarcely be distinguished, except by its inferior size, from that of the lion. The toes, five on the forefoot (of which the first or pollex is much shorter than the others) and four on the hind foot, are all armed with powerful, sharp-pointed, much-curved, compressed, retractile claws. The ground color of the fur varies from a pale fawn to a rufous buff, graduating into a pure white on the under parts and inside of the limbs. This is spotted over with dark brown or black; the spots on the back and sides being arranged in rosettes or broken rings, which vary greatly in size and distinctness in different individuals, but are without the central spot seen in those of the jaguar. The spots on the under parts and limbs are simple and blacker than those on the other parts of the body. The bases of the ears behind are black, the tips buff. The upper side of the tail is buff, spotted with broken rings like the back, its under surface white with simple spots. Perfectly black leopards, which, however, in certain lights show the characteristic markings on the fur, are not uncommon. These appear to be examples of *melanism*, occurring as individual variations, sometimes in one cub out of a litter of which the rest are normally colored, and therefore not indicating a distinct race, much less a species. These are met with chiefly in southern Asia.

In habits the leopard resembles the other large cat-like animals, yielding to none in the ferocity and bloodthirstiness of its disposition.

The present geographical range of the leopard is very extensive, as it is met with in various suitable localities, where not too much interfered with by human cultivation, throughout the greater part of Africa from Algeria to the Cape Colony; and through the whole of the south of Asia from Palestine to China, including all India south of the Himalayas, and the islands of Ceylon, Java, Sumatra, and Borneo.

LEOPARDI, GIACOMO, Italian poet, was born at Recanati in the March of Ancona, June 29, 1798. At sixteen he composed a Latin treatise on the Roman rhetoricians of the second century, a commentary on Porphyry's life of Plotinus, and a history of astronomy; at seventeen he wrote on the popular errors of the ancients, citing more than four hundred authors. A little later he imposed upon the first scholars of Italy by two odes in the manner of Anacreon. At eighteen he produced a poem of considerable length, the *Appressamento alla Morte*, which, after being lost for many years, has recently been discovered and published by Signor Zanino Volta. This juvenile work was succeeded (1819) by two lyrical compositions which at once placed the author upon the height which he maintained ever afterward. The ode to Italy, and that on the monument to Dante erected at Florence, gave voice to the dismay and affliction with which Italy, aroused by the French Revolution from the torpor of the seventeenth and eighteenth centuries, contemplated her forlorn and degraded condition, her political impotence, her degeneracy in arts and arms, and the frivolity or stagnation of her intellectual life. A third ode, on Cardinal Mai's discoveries of ancient MSS., lamented in the same spirit of indignant sorrow the decadence of Italian literature. In 1825 he accepted an engagement to edit Cicero and Petrarch for the publisher Stella at Milan, and took up his residence at Bologna, where his life was for a time made almost cheerful by the friendship of the countess Malvezzi. In 1827 appeared the *Operette Morali*, consisting principally of dialogues and his imaginary biography of Filippo Ottonieri, which have given him a fame as a prose writer hardly inferior to his celebrity as a poet. He died June 15, 1837.

LEOPOLD I., Holy Roman emperor, the second son of the emperor Ferdinand III. and Maria Anna of Spain, was born June 9, 1640. He became king of Hungary in 1655, and king of Bohemia in 1658, in which year he also received the imperial crown, the electors having chosen him in preference to Louis XIV. of France. Leopold had been educated for the church, and throughout life he had the tastes and sympathies of a churchman rather than those of a secular ruler. In 1672 Leopold came for the first time in direct collision with Louis XIV. As it seemed highly probable that the French king would not be content with the conquest of Holland, Leopold, as head of his hereditary territories and as emperor, associated himself with Brandenburg and Spain for the support of the Dutch. The treaty of Nimeguen having been signed by the Dutch in 1678, the emperor concluded peace in 1679. The French retained Freiburg in Breisgau; and soon afterward Louis XIV., instead of giving up towns which he had undertaken to resign, seized many new cities and districts. To these acts of robbery he gave an appearance of legality by instituting so-called "Chambers of Reunion." The German people bitterly resented this aggression, but the princes declined to interfere, and the energies of the emperor were fully occupied elsewhere. His system of government in Hungary was arbitrary and tyrannical, and in 1682 the Hungarians, headed by Emeric Tökölyi, broke into open revolt. They were encouraged by Louis XIV., who stirred up the Turks to join them in attacking Austria. In 1683 a Turkish army of 200,000 men, led by the grand vizier Kara Mustapha, entered Hungary, and pushed on to Vienna, which they besieged from July 14th till September 12th. The German princes were unwilling to act even in such an emergency as this, but at last an imperial army under the electors of Bavaria and Saxony marched toward Vienna, and they were joined by John Sobieski of Poland with a corps of 26,000 men. These troops, in association with the emperor's army under Duke Charles of Lorraine, attacked the Turks on September 12, 1683, at the Kalenberg, near Vienna. The Turks were so effectually defeated that they were soon driven from Hungary. Another great victory was gained over them at Mohacz in 1687; and in 1697 they were defeated by Prince Eugene at Zenta. In 1699 the treaty of Carlowitz was signed, whereby the emperor became complete master of the districts which the Turks had conquered in Hungary. Twelve years before (1687), the Hungarians, worn out by the struggle, had submitted to the emperor at the diet of Pressburg, the monarchy being made hereditary in the house of Hapsburg instead of elective. This settlement had scarcely been concluded when the emperor was involved in new troubles by the French invasion of the Palatinate in 1688. In 1701 began the war of the Spanish succession, waged by Leopold in defense of the claims of his second son Charles against those of Philip of Anjou, grandson of Louis XIV. In this war Leopold was supported by the empire, and by England, Holland, and Prussia. It opened with several victories gained by Prince Eugene; but afterward King Joseph and the margrave of Baden were repeatedly defeated, and the emperor was weakened by a renewal of the movement for national independence in Hungary. His confidence was revived by the battle of Blenheim, but he did not live to see the full results of that great victory. On May 5, 1705, he died of dropsy in the chest.

LEOPOLD II., Holy Roman emperor, was born on May 5, 1747. After the death of his father, the emperor Francis I., in 1765, he became the grand-duke of Tuscany, a country which he ruled for twenty-five years in a thoroughly enlightened spirit. Earlier than his brother, Joseph II., he saw the necessity of ecclesiastical reform, but he effected with moderation and good sense the changes which he considered advisable. Agriculture, industry, and commerce he encouraged in accordance with the ideas of his age, and Tuscany owed to him a well-conceived criminal code. He had even prepared a scheme for instituting representative government in Tuscany when, in 1790, he succeeded Joseph II. in the hereditary lands of the house of Hapsburg and in the empire. Joseph, with all his good intentions, had left his hereditary states in much confusion; and vigor and prudence were essential for the reëstablishment of order. The chief difficulty was in the Netherlands, which were disinclined to respond to Leopold's advances. He dispatched an army against them, and it entered Brussels on December 3, 1791. The country was then at his mercy; but he acted with great discretion, restoring certain ancient rights which Joseph, in his zeal for improvement, had withdrawn. In Hungary, too, the emperor succeeded in calming popular excitement; and on August 4, 1791, the treaty of Sistova was signed, bringing to an end the unlucky war which Joseph had waged with the Turks. The violence of the French revolutionists produced a bad effect on the internal policy of Leopold, who supposed that it was necessary, not only to introduce a secret police, but to limit the freedom of the press. The same influences led him to conciliate Prussia, which had been always on its guard against Austria since the establishment of the Confederation of Princes by Frederick the Great. On August 27, 1791, the emperor and the king of Prussia met at Pillnitz; and it was agreed that they should act together for the deliverance of Louis XVI. of France. In pursuance of this understanding a defensive and offensive treaty of alliance between Austria and Prussia was concluded on February 7, 1792; but the emperor's schemes were suddenly broken by death. He died on March 1, 1792, and was succeeded by his son, the emperor Francis II.

LEOPOLD I. (1790–1865), king of the Belgians, was the fourth son of Francis, duke of Saxe-Coburg-Saalfeld, and thus the uncle of Queen Victoria of England. His youth was chiefly spent in the Russian military service; he commanded a battalion at Lützen, Bautzen, and Leipsic, entered Paris with the allied sovereigns, and accompanied them to England. In May, 1816, he married the Princess Charlotte, only child of the Prince Regent (who died in the following year), having previously been created duke of Kendal, in the English peerage. In 1830 he declined the crown of Greece, but was elected to the throne of Belgium in June, 1831. (See BELGIUM, *ante.*)

LEOPOLD I., duke of Anhalt-Dessau, *der alte Dessauer*, a famous Prussian general, was born at Dessau, July 3, 1676. Possessing great physical energy and an absorbing interest in military affairs, he at an early age displayed capacity for commands of high responsibility. On the death of his father, in 1693, he succeeded him as colonel of a regiment in the service of Brandenburg, and, having rendered invaluable assistance at the capture of Namur by William III. of Orange, in 1696, he obtained the rank of major-general. In command of a division of 12,000 men at Blenheim, in 1704, Leopold so acted in a critical contingency as practically to turn the scales of victory; and in Eugene's Italian campaigns he was conspicuous at the battle of Cassano in 1705, the storming of Turin in 1706, and in other affairs of minor importance. After serving as a volunteer at Malplaquet, in 1709, he received an independent command from Prussia, and rendered important assistance to Marlborough against Villars. Created field-marshal in 1715, he gained the special confidence of Frederick William I., and it was in no small degree to his instructions in military tactics, and the splendid perfection to which he had brought the small army of Prussia, that the great military triumphs of Frederick II. were due. As a general, he specially excelled in stratagems and surprises, in which he was greatly aided by his daring and impetuous energy. These qualities were specially displayed in the surprise and bloodless capture of Mörs castle, in 1712; the seizure, during night, of the island of Rügen, in 1715; the formation, in 1741, of the famous intrenched camp at Göttin, near Magdeburg, where, with an army of 36,000 men, he was prepared for events either in Saxony or Hanover; the defeat of the Austrians at Neustadt, in 1744, and the expulsion of the Saxons, though superior both in numbers and artillery, from a strongly intrenched position at Kesselsdorf, in 1745. He died April 7, 1747.

LEPANTO (the Italian form of the modern Greek Epakto), known in ancient times as Naupactus, a name which has recently been revived in official documents, is a town in the monarchy of Acarnania and Ætolia, Greece, situated on a bay on the north side of the straits of Lepanto, by which the gulf of the same name is connected with that of Patras. It stands on the southeastern and southern slopes of one of the spurs of Mount Rigani; the surrounding plain is well watered and fertile, but the harbor, once the best on the northern coast of the Corinthian gulf, is now almost entirely choked up, and is accessible only to the smallest craft.

LEPIDOSIREN is the name of one of the most remarkable genera of fishes, of which one species (*Lepidosiren paradoxa*) has been found in tributaries of the river Amazon, and the other (*Lepidosiren annectens*) occurs in the systems of all the large rivers of tropical Africa. Together with the Australian *Ceratodus*, the lepidosirens are the only living representatives of a very old type of fishes, the *Dipnoi*, which reaches back to the Devonian age, thus giving us an insight into the organization of fishes of which nothing but some obscure and fragmentary impressions of the hard parts are preserved. The body of *Lepidosiren* is eel-shaped, and covered with small, thin scales. A single vertical fin surrounds the posterior part of the body and the tail; the paired fins are reduced to two pairs of long threads, internally supported by a series of small cartilages. The dentition is very characteristic, and consists of a pair of conical pointed vomerine teeth, and a pair of large cuspidate and ribbed molar teeth on the palate and in the lower jaw. The skeleton is notochordal; and lungs are present in addition to gills. From this latter fact it may be inferred that the lepidosirens can breathe air as well as water; and, although they have never been observed to leave the water voluntarily, either in a state of nature or in captivity, they rise from time to time to the surface to fill their lungs with a fresh supply of air; further, when, during the hot season, the water of the tanks in which they live changes into mud, branchial respiration is entirely superseded by pulmonal. This species is one of the greatest desiderata in zoölogical museums. The African species, on the other hand, is common in the upper Nile, in the central lake-region, in the Zambesi, and in all the rivers of the west coast. Specimens living in pools which dry up during the hot season bury themselves in the mud, and form an oval cavity, the inside of which is lined with a protecting coat of hardened mucus, and in which they wait, coiled up and in a torpid condition, for the return of the rainy season. These retreats are discovered by the natives by a circular opening at the upper surface, which is closed by the mucous film. If the capsules are not broken, the fishes, imbedded in the clay-balls, can be transported to Europe, and emerge from their prison on being placed in tepid water. Both species attain to a length of six feet, and feed on frogs, fishes, and other aquatic animals. (See ICHTHYOLOGY.)

LEPIDUS, M. ÆMILIUS, a member of the second Roman triumvirate, was a son of M. Æmilius Lepidus, who had been consul in 137 B.C. He joined the party of Cæsar in the civil wars, and was by the dictator thrice nominated *magister equitum* and raised to the consulship 46 B.C. He was a man of great wealth and influence, and it was probably more on this ground than on account of his ability that Cæsar raised him to such honors. In the beginning of 44 B.C. he was sent to Gallia Narbonensis, but before he had left the city with his army Cæsar was murdered. Lepidus, as commander of the only army near Rome, became a man of great importance in the troubles which followed. Taking part with Antony, he joined in the reconciliation which the latter effected with the senatorial party, and afterward sided with him when open war broke out. Antony, after his defeat at Mutina, joined Lepidus in Gaul, and in August, 43 B.C., Octavian, who had forced the senate to make him consul, effected an arrangement with Antony and Lepidus, and the triumvirate was organized at Bononia. Antony and Octavian soon reduced Lepidus to an inferior position. His province of Gaul and Spain was taken from him; and, though he was included in the triumvirate when it was renewed in 37 B.C., his power was only nominal. He made an effort in the following year to regain some reality of power, conquered part of Sicily, and claimed the whole island as his province, but Octavian found means to sap the fidelity of his soldiers, and he was obliged to supplicate for his life. He was allowed to retain his fortune and the office of *pontifex maximus*, to which he had been appointed in 44 B.C., but had to retire into private life. He died 13 B.C.

LEPROSY (*Lepra Arabum*, *Elephantiasis Græcorum*), the greatest disease of mediæval Christendom, is identified, on the one hand, with a disease endemic from the earliest historical times (1500 B.C.), in the delta and valley of the Nile, and on the other hand with a disease now common in Asia, Africa, South America, the West Indies, and certain isolated localities of Europe. An authentic representation of the leprosy of the Middle Ages exists in a picture at Munich by Holbein, painted at Augsburg in 1516; St. Elizabeth gives bread and wine to a prostrate group of lepers, including a bearded man whose face is covered with large, round, reddish knobs, an old woman whose arm is covered with brown blotches, the legs swathed in bandages through which matter oozes, the bare knee also marked with discolored spots, and on the head a white rag or plaster, and, thirdly, a young man whose neck and face (especially around the somewhat hairless eyebrows) are spotted with brown patches of various size. It is conjectured by Virchow that the painter had made studies of lepers from the leper-houses then existing at Augsburg. These external characters of mediæval leprosy agree with the descriptions of it by the ancients, and with the pictures of modern leprosy given by Danielssen and Boeck for Norway, by various authors for sporadic European cases, by Anderson for Malacca, by Carter for India, by Wolff for Madeira, and by Hillis for British Guiana. Egypt was regarded by the ancients (positively by Lucretius) as the country whence leprosy came. It was probably endemic among the Hebrews when they migrated from Egypt. The minute diagnostic indications given in Lev. xiii. appear to relate to true leprosy and to other diseases that might be mistaken for it, and the frequently recurring word Sâra'ath (translated "leprosy") is best taken in a generic sense; those cases in which progress would show itself at so short intervals as seven days, and those cases for which the ceremonial of cleansing was provided, could hardly have been cases of leprosy, a disease always incurable, and with stages reckoned rather by months or years than by weeks. Herodotus knew of leprosy as existing in Persia. The earlier Greek and Latin writers speak of it as a foreign disease, but it became established in Greece and Italy in the first century B.C.; Pliny implies that it was introduced by the army of Pompey returning from Syria. The disease soon appeared in the Roman colonies of Spain, Gaul, and Britain. The Lombard king Rothar (seventh century) made laws regulating the marriage of lepers, and similar laws were made by Pippin and Charlemagne. Leper-houses existed at Verdun, Metz, and Maestricht in the seventh century, at St. Gall in the eighth, and at Canterbury in the eleventh. It was amid the stir and movement of the crusades that leprosy grew to be epidemic in western Europe; it attacked the people in great numbers and in all ranks (including members of royal families) Leper-houses (mostly religious and dedicated to St. Lazarus, but in northern Europe more secular and dedicated to St. George) were founded in every considerable town; the total number of these in Europe was loosely estimated by Matthew Paris at 19,000, the number in France is independently estimated at 2,000, and (according to Sir J. Y. Simpson) there were ninety-five houses of the first class in England (of these seven at Norwich and five at Lynn), and several in Ireland and Scotland. The isolation of lepers was strictly enforced by law and popular sentiment. They wore a special costume, usually a long gray gown with hood drawn over the face, and carried a wooden clapper to give warning of their approach. They were forbidden to enter inns, churches, mills, or bakehouses, to touch healthy persons or eat with them, to wash in the streams, or to walk in narrow footpaths. The disease began to decline (first in Italy) in the fifteenth century, and had mostly disappeared in the seventeenth. A leper-house was founded in Edinburgh (at Greenside) as late as 1591, and it was not till 1741 (others give 1798) that the last known leper died in Shetland.

Survivals of the great mediæval outbreak are found on the west coast of Norway (about two thousand lepers; leper hospital at Bargen founded 1277, now added to), in the Baltic provinces of Russia (leper hospitals founded at Riga in 1220 and Reval 1237, not now in use), on the Riviera (a small and diminishing number), on the Sicilian coasts, and in certain coast provinces of Spain and Portugal (leper hospital at Lisbon since the thirteenth century). Sporadic cases of home origin have also been described for Hungary and Roumania; the cases occurring in England and France are in persons who have been born or have lived in the East or West Indies. The disease is met with also in Iceland, along the Caspian and delta of the Volga, along the Black Sea, and in islands of the Levant (especially Scio and Crete). It is common all over the East from Syria to Japan and Kamchatka, in Egypt and North African states, in West Africa from the Senegal to the Congo, in Cape Colony, Madagascar, Mauritius, Isle de Bourbon, St. Helena, Madeira, Canaries and Azores, Brazil, Central America, the West Indies, Mexico, New Brunswick (small isolated French colony), and especially in the Hawaiian Islands. Leprosy has been found among Chinese emigrants in the United States, and in Queensland.

Leprosy is an incurable constitutional disease, marked externally by discolored patches and nodules on the skin, and deeply implicating the structure and function of the peripheral nervous system. Like the infections, it has a prodromal stage, which is uncertain in its character, and is measured rather by months or years than by days or weeks; the chief premonitory symptoms are unaccountable lassitude and mental depression, pains in the limbs and joints, febrile periods (cold and hot fits), loss of appetite, and nausea. That stage is followed by the "periodically eruptive stage," during which blotches on the skin come and go; sooner or later these erythematous congestions and exudations leave either permanent spots, brown or blanched, which are often without feeling, or they leave nodules. The disease diverges into two main varieties, the spotted (*Lepra maculosa*) and the nodular (*Lepra tubercolosa*). The two kinds are found side by side in the same population, and sometimes in the same person. Leprosy has been claimed as one of the diseases caused by parasites, on several occasions by old writers in the gross sense, and recently by observers who have found innumerable minute bacillus-rods within the cells of the leprous new growth. The essential cause of leprosy is unknown. It probably arose in the Delta and valley of the Nile in prehistoric times, and under similar climatic and telluric conditions in other (chiefly intertropical) countries; and the most memorable fact in its history is its rise and subsidence as an epidemic disease in Europe. The old opinion that leprosy is contagious is now generally discredited.

LEPTIS, now LEBDA, the leading city of the ancient *Tripolis*, Northern Africa, extensive ruins of which exist on the coast, about fifty miles east of Tripoli. Leptis Magna, as it is usually called to distinguish it from Leptis Parva (now Lemta) in Byzacium, was a Phœnician colony, probably superimposed on an old Libyan settlement. The old town, of which the massive quays and docks are still extant, is similar to Carthage in position and plan, occupying a tongue of land to the west of the harbor. The new town, whose simple appellation Neapolis almost threatened the disuse of the name Leptis, is much more extensive; but the ruins belong to the later period of the Roman empire. Septimius Severus was a native of the place; and he not only bestowed upon it the *jus Italicum*, but enriched it with many costly buildings, the most remarkable being the palatium dedicated *fortunæ suæ*. Ammianus mentions that Leptis was laid waste by the Austurians (a Libyan tribe) in 370; and, though Justinian inclosed a part of the city with new walls and made it the military seat of the province of Tripolis, it never recovered its prosperity, and from the time of the Arab conquest it disappears from history. The local inscriptions are Greek, Latin, and Punic.

LÉRIDA, one of the forty-nine provinces of Spain, is bounded on the north by France (and the "republic" of Andorra), on the east by Gerona and Barcelona, on the south by Tarragona, and on the west by Saragossa and Huesca, and has an area of 4,775 square miles, with a pop. (1898) of 274,867. It is almost entirely mountainous, and partakes of the features common to the whole southern slope of the Pyrenees. The principal river is the Segre, a tributary of the Ebro. The province has five cities, Lérida, Balaguer (Bergusia), Cervera, Seo de Urgel, and Solsona, but only the first-mentioned of these has a population exceeding 5,000; the next largest (Balaguer), in 1887, had only 4,742. The inhabitants are chiefly employed in pastoral occupations.

LÉRIDA, the capital of the above province, and in point of numbers and prosperity the second city in Catalonia, is situated on the right bank of the Segre, crossed there by a handsome stone bridge. The distances by rail from Saragossa and Barcelona, respectively, are 114 and 113 miles. Population, 17,672.

LERMONTOFF, MIKHAIL YUREVITCH, often styled the poet of the Caucasus, was born in Moscow. The intellectual atmosphere which he breathed in his youth differed little from that in which Pushkin had grown up, though the domination of French had begun to give way before the fancy for English, and Lamartine shared his popularity with Byron. From the academic gymnasium in Moscow Lermontoff passed in 1830 to the university, but there his career came to an untimely close through the part he took in some acts of insubordination to an obnoxious teacher. From 1830 to 1834, he attended the school of cadets at St. Petersburg, and in due course he became an officer in the guards. To his own and the nation's anger at the loss of Pushkin (1837) the young soldier gave vent in a passionate poem addressed to the czar. The czar seems to have found more impertinence than inspiration in the address, for Lermontoff was forthwith sent off to the Caucasus as an officer of dragoons. He was in St. Petersburg in 1838 and 1839, and in the latter year wrote the novel *A Hero of Our Time*, which is said to have been the occasion of the duel in which he lost his life in July, 1841. In this contest he had purposely selected the edge of a precipice, so that if either combatant was wounded so as to fall his fate should be sealed.

LEROUX, PIERRE (1798–1871), a French writer on philosophy and politics, commonly recognized as the chief of the (so-called) Humanitarian school, was born at Paris. From the year 1843 M. Leroux devoted himself to the practical applications of his doctrines. He established at Boussac (Creuse) a printing association organized according to his systematic ideas, and founded the *Revue Sociale*, in which, as well as in separate publications, he continued to explain and develop his theoretic views, and his suggestions for the renovation of society, professing, among other things, to supply a "pacific solution of the problem of the proletariat." After the outbreak of the revolution of 1848, he was elected to the constituent assembly as representative of the department of the Seine, obtaining 90,000 votes, and afterward, in 1849, to the legislative assembly. He spoke there on the organization of labor, on the colonization of Algeria, and other questions. His discourses from the tribune were sometimes of so abstract and mystical a character, and contained proposals so eccentric and impracticable, that they rather created ridicule than influenced opinion. The *coup d'état* of 1851 made him an exile; he settled, with his family, in Jersey, where he pursued agricultural experiments. The general amnesty of 1860 permitted his return to France, but he lived at Lausanne till after the definitive amnesty of 1869, when he again fixed his residence at Paris. He died there in April, 1871, during the reign of the Commune. The body deputed two of its members to attend his funeral, as a homage, "not to the partisan of the mystical idea, of which we now feel the evil, but to the politician who, after the days of June, courageously undertook the defense of the vanquished."

LEROY, a post village of Genesee county, N. Y., at the junction of three railroads. It contains a national bank and one other bank, two newspaper offices, an academy and an institute, seven churches, and some manufacturing establishments. Population (1900), 3,144.

LERWICK. See SHETLAND ISLANDS.

LE SAGE, ALAIN RENÉ, novelist and dramatist, was born at Sarzeau, in the peninsula of Rhuys, on May 8, 1668, and died on November 17, 1747, at Boulogne-sur-Mer. Rhuys was a legal district, and Claude Le Sage, the father of the novelist, held the united positions of advocate, notary, and registrar of its royal court. He began modestly as a translator, and published in 1695 a French version of the *Epistles* of Aristænetus, which was not successful. Shortly afterward he found a valuable patron and adviser in the Abbé de Lyonne, who bestowed on him an annuity of 600 livres, and recommended him to exchange the classics for Spanish literature, of which he was himself a student and collector. La Sage began by translating plays chiefly from Rojas and Lope de Vega. *Le Traitre Puni* and *Le Point d'Honneur* from the former, *Don Félix de Mendoce* from the latter, were acted or published in the first two or three years of the eighteenth century. In 1704 he translated the continuation of Don Quixote by Avellaneda, and soon afterward adapted a play from Calderon, *Don César Ursin*, which had a divided fate, being successful at court and damned in the city. He was, however, nearly forty before he obtained anything like decided success. But in 1707 his admirable farce of *Crispin Rival de son Maître* was acted with great applause, and *Le Diablo Boiteux* was published. This latter went through several editions in the same year, and was frequently reprinted till 1725, when Le Sage altered and improved it considerably, giving it its present form. Notwithstanding the success of *Crispin*, the actors did not like Le Sage, and refused a small piece of his called *Les Étrennes*. He thereupon altered it into *Turcaret*, his theatrical masterpiece, and one of the best comedies in French literature. This appeared in 1709. Some years passed before he again attempted romance writing, and then the first two parts of *Gil Blas* appeared in 1715. Strange to say, it was not so popular as the *Diable Boiteux*. Le Sage worked at it for a long time, and did not bring out the third part till 1724, nor the fourth till 1734. For this last he had been part paid to the extent of a hundred pistoles some years before its appearance. This is the only positive statement we have about his gains. During these twenty years he was, however, continually busy. Notwithstanding the great merit and success of *Turcaret* and *Crispin*, the Théâtre Français did not welcome him, and in the year of the publication of *Gil Blas* he began to write for the Théâtre de la Foire—the comic opera held in booths at festival time. This, though not a very dignified occupation, was followed by many writers of distinction at this time, and by none more assiduously than by Le Sage. According to one computation he produced either alone or with others about a hundred pieces, varying from strings of songs with no regular dialogues to comediettas only distinguished from regular plays by the introduction of music. He was also industrious in prose fiction. Besides finishing *Gil Blas* he translated the *Orlando Inamorato*, rearranged *Guzman d'Alfarache*, published two more or less original novels, *Le Bachelier de Salamanque* and *Estévanille Gonzales*, and in 1733 produced the *Vie et Aventures de M. de Beauchêne*, which is curiously like certain works of Defoe. Besides all this, Le Sage was also the author of *La Valise Trouvée*, a collection of imaginary letters, and of some minor pieces, of which *Une Journée des Parques* is the most remarkable. This laborious life he continued until 1740, when he was more than seventy years of age. At Boulogne, Le Sage spent the last seven years of his life, dying on November 17, 1747, at the age of nearly eighty.

LESBOS was the name applied by the Greeks to the island now called Metilin—the ancient name of the chief city on the island, Mytilene, having been in the Middle Ages applied to the whole island. It lies along the coast of Mysia, north of the entrance to the Gulf of Smyrna. The surface is mountainous, but the soil is, in spite of this, exceedingly fertile; the wine, oil, and grain of Lesbos were well known in ancient times. The climate is, perhaps, more delightful than that of any other part of the Ægean; the breezes and the sea temper the heat of summer, and the winter is not severe. Earthquakes were often experienced in the island; the latest, that of 1861, is still remembered as one of the severest known in a country of earthquakes.

The island begins to be important in history from the time of the Æolian immigration, which is said to have commenced 130 years after the Trojan war; from this time it continued long to be one of the chief homes of Hellenic civilization. Homer refers to its wealth and its populous cities; its chief fame lies in its connection with the earliest development of Greek poetry and literature. Lesches, the cyclic poet; Terpander, Arion, Hellanicus, Pittacus, Alcæus, and Sappho were all natives of Lesbos. Probably no district of Greece can boast of so many names, most of them associated with some marked advance in literature, as Lesbos can enumerate between 700 and 500 B.C.

The chief city of Lesbos was Mytilene or Mitylene, the latter spelling being general in literature, while the former is the official spelling used on coins.

The city has always been known for its delightful and healthy climate. With the advantage of its strong situation and good harbor it soon became one of the most powerful Greek cities of Asia Minor. It was the only Æolian city that possessed a strong navy. Its colonies were spread along Asia Minor and Thrace, and in the sixth century it maintained a long though finally unsuccessful contest with Athens for the possession of Sigeum. The city fell under the Persian power after the defeat of Crœsus. A tyrant, Coes, ruled it soon after, but was expelled when the island joined the Ionic revolt in 500 B.C. It was freed from the Persian yoke after the battles of Platæa and Mycale, and was a member of the Delian confederacy. It revolted from Athens 429 B.C., and was reduced after a long siege. The story of the cruel revenge which the Athenian assembly at first resolved on, of the second meeting and the more merciful resolution, and of the arrival of the second dispatch vessel barely in time to prevent the massacre of the whole male population, has been told by Thucydides. It continued to be a rich and prosperous city throughout ancient history, and its name came during the Byzantine period to be applied to the whole island. It was long a stronghold of the Venetians during the Middle Ages, but has belonged to the Turkish empire since 1460.

The other chief towns besides Mytilene were Methymna, Antissa, Eresus, and Pyrrha; hence the island is sometimes called a Pentapolis.

LESGHIANS, or LESGHIS, a number of tribes in the Caucasus forming along with the Tchetchenians (about 165,000) the East Caucasus group, and spreading southward over the borders of Daghestan, the country which they have occupied from time immemorial, into the Transcaucasian circles Kuba, Shemakha, Nukha, and Sakataly. Among the Lesghians the chief place, both on account of numbers and importance, is due to the Avars (155,194) and the closely related Andians (35,511), to whom may be attached the Dido (9,074) and a number of small tribes, confined to a few villages or even to one, and speaking different though intimately connected languages. The Avars, extending from the Sulak and the Kumyk steppe right through Daghestan to the Alasan in the Sakataly circle, were once the dominant people as their language is still the dominant language of all this district. Their neighbors, the Kasimukhians (35,139), who call themselves Lakians, have a language of their own, and are well known as traders not only through all Transcaucasia but also in European Russia; beside them a small fragment of another race occupies the village Artchi (592 inhabitants) in a separate mountain valley. Toward the Caspian Sea the Lakians are bordered by the Darginians (88,045) and the Tabassaranians (16,350), who in the matter of dialect are strongly marked off from each other.

LESLEY, JOHN, bishop of Ross, Scottish historian and statesman, was born in 1527. He was educated at the university of Aberdeen, where he took the degree of M.A. In 1538 he obtained a dispensation permitting him to hold a benefice, notwithstanding his being a natural son, and in June, 1546, he was made an acolyte in the cathedral church of Aberdeen, of which he was afterward appointed a canon and prebendary. He also studied at Poitiers, at Toulouse, and at Paris, where he was made doctor of laws. In 1558 he was appointed official of Aberdeen, and in 1559 he was inducted into the parsonage and prebend of Oyne. At the Reformation Lesley became a champion of the Roman faith, and appeared on that side at the disputation held in Edinburgh in 1561, when Knox was one of his antagonists. He was one of the commissioners sent the same year to bring over the young Queen Mary to take the government of Scotland. He returned in her train, and was appointed a privy councilor, and in 1564 one of the senators of the college of justice. Shortly afterward he was made abbot of Lindores, and in 1565 bishop of Ross. He was one of the sixteen commissioners appointed to revise the laws of Scotland, and the volume of the acts of Parliament known as the Black Acts was, chiefly owing to his care, printed in 1566.

The bishop was one of the most steadfast friends of Queen Mary. After the failure of the royal cause, and while Mary was a captive in England, Lesley continued to exert himself on her behalf. He was one of the commissioners at the conference at York in 1568. He also projected a marriage for her with the duke of Norfolk, which ended in the execution of that nobleman. For this he was put under the charge of the bishop of Ely, and afterward imprisoned in the Tower of London. During his confinement he collected materials for his history of Scotland, with which his name is now chiefly known. In 1571 he presented the latter portion of this work, written in his own vernacular tongue, to Queen Mary to amuse her in her captivity. He also wrote for her use his *Piæ Consolationes*, and the queen devoted some of the hours of her captivity to translating a portion of it into French verse.

In 1573 he was liberated from prison, but was banished from England. For two years he attempted unsuccessfully to obtain the assistance of Continental princes in favor of Queen Mary. While at Rome in 1578 he published his history *De Origine, Moribus, et Rebus Gestis Scotorum*, the Latinity of which is held only second to that of Buchanan. In 1579 he went to France, and was made suffragan and vicar-general of the archbishopric of Rouen by the Cardinal de Bourbon. While visiting his diocese, however, he was thrown into prison, and had to pay 3,000 pistoles to prevent his being given up to Elizabeth. During the remainder of the reign of Henry III. he lived unmolested, but on the accession of the Protestant Henry IV. he again fell into trouble. In 1590 he was thrown into prison, and had to purchase his freedom at the same expense as before. In 1593 he was made bishop of Coutances in Normandy, and had license to hold the bishopric of Ross till he should obtain peaceable possession of the former see. Being tired of life, he retired at last to a monastery at Gurtenburg, near Brussels, where he died in 1596.

LESLIE, Alexander. See Leven, Earl of.

LESLIE, or Lesley, Charles (1650–1722), a prominent nonjuror, famous as the author of *A Short and Easy Method with the Deists*, was born in Ireland, where his father, Dr. John Leslie, was bishop of Raphoe and subsequently of Clogher.

LESLIE, Charles Robert, one of the most popular of English genre-painters, was born in London on October 19, 1794. His parents were American, and when he was five years of age he returned with them to their native country. They settled in Philadelphia, where their son was educated and afterward apprenticed to a bookseller. He was, however, mainly interested in painting and the drama, and when George Frederick Cooke visited the city he executed a portrait of the actor, from recollection of him on the stage, which was considered a work of such promise that a fund was raised to enable the young artist to study in Europe. He left for London in 1811, bearing introductions which procured for him the friendship of West, Beechey, Allston, Coleridge, and Washington Irving, and was admitted as a student of the Royal Academy, where he carried off two silver medals. At first, influenced by West and Fuseli, he essayed "high art," and his earliest important subject depicted *Saul and the Witch of Endor;* but he soon discovered his true aptitude and became a painter of cabinet-pictures, dealing, not like those of Wilkie, with the contemporary life that surrounded him, but with scenes from the great masters of fiction, from Shakespeare and Cervantes, Addison and Molière, Swift, Sterne, Fielding, and Smollett. Of individual paintings we may specify *Sir Roger de Coverley Going to Church*, 1819; *May-day in the Time of Queen Elizabeth*, 1821; *Sancho Panza and the Duchess*, 1824; *Uncle Toby and the Widow Wadham*, 1831; *La Malade Imaginaire*, act iii. sc. 6, 1843; and the *Duke's Chaplain Enraged Leaving the Table*, from *Don Quixote*, 1849. In 1821 Leslie was elected A.R.A., and five years later full academician. In 1833 he came to America to become teacher of drawing in the military academy at West Point, but the post proved an irksome one, and in some six months he returned to England, where he practiced his profession with unfailing assiduity till his death on May 5, 1859.

LESLIE, Sir John (1766–1832), geometrician and physicist, was born of humble parentage at Largo, Fifeshire, Scotland. In 1805 he was elected to succeed Playfair in the chair of mathematics at Edinburgh, not, however, without violent though unsuccessful opposition on the part of a narrow-minded clerical party who accused him of heresy in something he had said as to the "unsophisticated notions of mankind" about the relation of cause and effect. During his tenure of this chair he published two volumes of a *Course of Mathematics*—the first, entitled *Elements of Geometry, Geometrical Analysis, and Plane Trigonometry*, in 1809, and the second, *Geometrical Analysis, and Geometry of Curve Lines*, in 1821; the third volume, on "Descriptive Geometry" and the "Theory of Solids" was never completed. With reference to his invention (in 1810) of a process of artificial congelation, he published in 1813 *A Short Account of Experiments and Instruments Depending on the Relations of Air to Heat and Moisture;* and in close connection with the subject of this treatise he also wrote a paper on the æthrioscope, which appeared in 1818 in the *Transactions of the Royal Society of Edinburgh*. In 1819, on the death of Playfair, he was promoted to the more congenial chair of natural philosophy, which he continued to hold until his death, and in 1823 he published, chiefly for the use of his class, the first volume of his never-completed *Elements of Natural Philosophy*. Leslie's main contributions to physics were made by the help of the "differential thermometer," an instrument whose invention was contested with him by Count Rumford. By adapting to this instrument various ingenious devices he was enabled to employ it in a great variety of investigations, connected especially with photometry, hygroscopy, and the temperature of space. In 1820 he had been elected a corresponding member of the Royal Institute of France, the only distinction of the kind which he valued, and early in 1832 he was, on the recommendation of Lord Chancellor Brougham, created a knight of the Guelphic order.

LESLIE, Thomas Edward Cliffe, one of the ablest and most original English economists of the present century, was born in the county of Wexford in (as is believed) the year 1827. Cliffe Leslie received his elementary education from his father, who resided in England, though holding church preferment as well as possessing some landed property in Ireland; by him he was taught Latin, Greek, and Hebrew, at an unusually early age; he was afterward for a short time under the care of a clergyman at Clapham, and was then sent to King William's College, in the Isle of Man, where he remained until, in 1842, being then only fifteen years of age, he entered Trinity College, Dublin, where he was a distinguished student. He became a law student at Lincoln's Inn, was for two years a pupil in a conveyancer's chambers in London, and was called to the English bar. But his attention was soon turned from the pursuit of legal practice, for which he seems never to have had much inclination, by his appointment, in 1853, to the professorship of jurisprudence and political economy in Queen's College, Belfast. The duties of this chair requiring only short visits to Ireland in certain terms of each year, he continued to reside and prosecute his studies in London, and became a frequent writer on economic and social questions in the principal reviews and other periodicals. In 1870 he collected a number of his essays, adding several new ones, into a volume entitled *Land Systems and Industrial Economy of Ireland, England, and Continental Countries.*

Two essays of Leslie's appeared in volumes published under the auspices of the Cobden Club, one on the "Land System of France" (2d ed., 1870), containing an earnest defense of *la petite culture* and still more of *la petite propriété;* the other on "Financial Reform" (1871), in which he exhibited in detail the impediments to production and commerce arising from indirect taxation. Many other articles were contributed by him to reviews between 1875 and 1879, including several discussions of the history of prices and the movements of wages in Europe, and a sketch of life in Auvergne in his best manner; the most important of them, however, related to the philosophical method of political economy, notably a memorable one which appeared in the Dublin University periodical, *Hermathena.* In 1879 the provost and senior fellows of Trinity College published for him a volume in which a number of these articles were collected under the title of *Essays in Political and Moral Philosophy.* These and some later essays, which ought one day to be united with them, together with the earlier volume on *Land Systems*, form the essential contribution of Leslie to our economic literature. He had long contemplated, and had in part written, a work on English economic and legal history, which would have been his *magnum opus.* He died at Belfast, whither he had gone to discharge his professional duties, January 27, 1882, in the fifty-fifth year of his age.

LESSING, GOTTHOLD EPHRAIM, was born at Kamenz, in Upper Lusatia, Saxony, January 22, 1729. At the time of Lessing's birth his father was one of the clergymen of Kamenz, where, a few years afterward, he became pastor primarius, or head pastor. There was at this time in Leipsic an excellent actress, Frau Neuber, who had gathered around her a number of respectable players, and Lessing, in company with Weisse, was one of the most regular attendants at her theater. At St. Afra's he had begun a comedy, *Der Junge Gelehrte*, and this he now completed. Frau Neuber immediately accepted it, and it was received with much favor by the public of Leipsic.

Alarmed by the reports of what was supposed to be his dissolute life, the elder Lessing summoned him to Kamenz, where he remained for some months. He soon succeeded in overcoming the fears of his parents, who allowed him to return to Leipsic on condition that he would devote himself to the study of medicine. Some medical lectures he did attend; but his ambition was to become a great dramatist, and as long as Frau Neuber's company kept together he occupied himself almost exclusively with the theater, being frequently present at rehearsal during the day as well as at the performance in the evening.

In 1748 the company broke up, and Lessing, finding nothing to interest him in Leipsic, went to Wittenberg, and afterward, toward the end of the year, to Berlin, where he spent three years, maintaining himself chiefly by literary work. He translated two volumes of Rollin's history, wrote some of the best of his early plays, and, in association with Mylius, started a periodical (which soon came to an end) for the discussion of matters connected with the drama. Early in 1751 he accepted the office of literary critic to the *Voss Gazette*, and in this position he reviewed some of the most important German and French books of the day, manifesting already to some extent the learning, judgment, and wit which were to make him the greatest critic of modern times. His father had been bitterly opposed to his scheme of life, and in 1751 urged him to complete his studies at the university of Wittenberg. Feeling the need of further thought and research, Lessing at last consented, and at the close of the year left Berlin.

Lessing remained about a year in Wittenberg, where he passed most of his time in the university library, every volume in which, he afterward declared, had passed through his hands. Having taken the degree of master of arts, he returned to Berlin, determined to make literature his profession; and the next three years were among the busiest of his life. Besides translating for the booksellers, he issued several numbers of the *Theatralische Bibliothek*, a periodical essentially the same as that which he had begun with Mylius. He also resumed his labors as critic to the *Voss Gazette.* For many years the most influential writer in Germany had been Gottsched, the Leipsic professor, who continually proclaimed the necessity of rigid adherence, in the drama and in poetry, to French rules. In his articles for the *Voss Gazette*, Lessing made it his principal object to ridicule the pretensions of Gottsched and his school, and in a short time there was no writer of whom they were so much afraid. In 1754 he produced a deep impression by *Ein Vede Mecum für den Herrn Sam. Gotth. Lange*, in which he exposed with bitter satire Lange's errors in his popular translation of Horace. During these three years Lessing took a definite position in contemporary literature by issuing, in six small volumes, those of his writings which he considered worthy of preservation. They included his lyrics and epigrams, some of the latter being in German, others in Latin. Most of his lyrics were written in Leipsic, and had already appeared during his first residence in Berlin, in a volume of *Kleinigkeiten*, published without his name. The epigrams, many of which were produced in Wittenberg, are in the style of Martial, and give evidence, like Lessing's critical writings, of a keen and biting humor. Among the collected writings there was also a remarkable series of *Letters*, in which, for the first time in German literature, some of the results of extensive learning were presented in a free and vivid style. Even more important, perhaps, were the papers entitled *Rettungen*, in which he undertook to vindicate the character of various writers who had been misunderstood by preceding generations. One of the best of these *Rettungen* is on Horace, whom he defends against the critics who charge him with sensuality and cowardice. In addition to these varied contents, Lessing published in the six volumes of his *Schriften* his early plays and *Miss Sara Sampson.* Of the former the chief are *Der Junge Gelehrte*, already mentioned, *Der Freidenker*, *Die Juden*, and *Der Misogyn.* Although superior to any other German comedies produced at the same time, they cannot be said to reveal a high dramatic faculty. *Miss Sara Sampson*, written in 1755, marks a wholly different stage of his development. It has many faults both in conception and in execution, but it exercised a powerful influence by indicating to the dramatists of Germany that materials for tragedy are to be found in the experiences of ordinary men and women as well as in those of "the great."

This tragedy, when represented in Frankfort-on-the-Oder, was received with so much applause that he resolved to devote himself to the drama; and in fulfillment of his design he suddenly quitted Berlin in October, 1755, and went to Leipsic, where a good theater had been lately established. During his second residence in Berlin he had made his name widely known, and he had secured several friends, whose affection he retained during the rest of his life. The chief of these was Moses Mendelssohn, in association with whom in 1755 he wrote an admirable treatise, *Pope ein Metaphysiker*, tracing sharply the lines which separate the poet from the philosopher. The Berlin Academy of Sciences had offered a prize for the best essay on Pope's doctrine that "Whatever is, is right," as compared with the optimism of Leibnitz. The treatise of the two friends was written to show that there cannot be a true comparison between a poetic and a philosophic conception; and they threw much light on the aims both of Leibnitz and of Pope. Other Berlin friends of Lessing were Nicolai, the bookseller, and Ramler, the author of many well-known odes. He had also made the acquaintance of Gleim, the Halberstadt poet, and Ewald Christian von Kleist, a Prussian officer, whose fine poem, *Der Frühling*, had won for him Lessing's warm esteem.

In Leipsic, Lessing was asked by Winkler, a wealthy young merchant, to accompany him in a foreign tour, which was to last three years. As he offered liberal terms Lessing consented; and early in the summer of 1756 they started for England. They did not, however, get beyond Amsterdam, for after the outbreak of the Seven Years' War they heard that Winkler's house was occupied by the Prussian commandant; and he deemed it necessary to hasten back. After some time Winkler was offended by Lessing's intimacy with certain Prussian officers, and suddenly announced to him that he must consider their engagement at an end. Lessing demanded compensation, and in the end the courts decided in his favor, but not until the case had dragged on for about six years. In the meantime it detained him in Leipsic, and as there was little opportunity for earning money by literature in a city occupied by foreign troops, he went through a period of extreme hardship. During these anxious months he began the study of mediæval poetry, in which some interest had been awakened by the Swiss school of critics; he also translated several English writings, and worked occasionally for the *Bibliothek*, a periodical edited by Nicolai.

His third residence in Berlin was made memorable by the *Literaturbriefe*, a series of critical essays (written in the form of letters to a wounded officer) on the principal works that had appeared since the beginning of the Seven Years' War. The scheme was suggested by Nicolai, by whom the *Letters* were published. Those written by Lessing manifested far higher intellectual power than anything he had yet accomplished. The critical principles set forth in the *Literaturbriefe* are now universally recognized, but they were then new. He insisted especially on the necessity of truth to nature in the imaginative presentation of the facts of life, and in one letter he boldly proclaimed the superiority of Shakespeare to Corneille, Racine, and Voltaire. At the same time he marked the immutable conditions to which even genius must submit in order to move enduring sympathies. While in Berlin at this time, he edited with Ramler a selection from the writings of Logau, a vigorous epigrammatist of the seventeenth century, and introduced to the German public *The War-Songs of a Grenadier*, by Gleim. He admired the vigor of these songs, but in several private letters protested against the vehemence of the author's patriotism—patriotism being a virtue which, he thought, he "could do very well without." In 1759 he published *Philotas*, a prose tragedy; and in the same year appeared a complete collection of his fables, with an essay on the essential idea of the fable.

In 1760 Lessing went to Breslau to apply for the post of secretary to General Tauentzien, to whom Kleist had introduced him in Leipsic. Tauentzien was not only a general in the Prussian army, but governor of Breslau, and director of the mint. He willingly granted the vacant office to Lessing, who retained it for more than four years. He associated chiefly with Prussian officers, went much into society, and became passionately fond of the gaming table, where he played for such high stakes that even General Tauentzien expostulated with him. While, however, he seemed to be wasting his energies, he never lost sight of his true goal. He gradually collected a library of about 6,000 volumes (which he was ultimately obliged to sell); and after the conclusion of the Seven Years' War in 1763 he resumed more enthusiastically than ever the studies which had been partly interrupted. In investigating the early history of Christianity, he obtained a profound knowledge of the fathers; and a remarkable letter to Mendelssohn shows that he had penetrated more deeply than any contemporary thinker into the significance of the philosophy of Spinoza. In 1764 he was prostrated by a severe illness, during which he reviewed, in a rather sorrowful spirit, his past life, and formed many serious resolutions for the future. Before this time he had worked hard at *Laocoon*, and in fresh spring mornings he had sketched in a garden the plan of *Minna von Barnhelm*. His parents were now in exceedingly straitened circumstances, and often appealed to him for aid. He responded generously to their demands, but they greatly overrated his power to help them, as they assumed that he intended to remain permanently in General Tauentzien's service. In reality, he had always regarded the engagement as a temporary one, and in 1765 he resigned his office and left Breslau to become a resident of Berlin, whither he went after a brief visit to Kamenz and Leipsic. His friends exerted themselves to obtain for him the office of keeper of the royal library, but Frederick declined to consider his claims, although, about the time when Lessing went to Breslau, he had confirmed his election as a foreign member of the Berlin Academy of Sciences. During the two years which Lessing now spent in the Prussian capital he was restless and unhappy, yet it was during this period that he published two of his greatest works—*Laocoon* in 1766, and *Minna von Barnhelm* in 1767. *Laocoon* ranks as a classic not only in German but in European literature, and its style alone, which is as near perfection as anything Lessing ever wrote, would almost entitle it to this position. His central aim is to define by analysis the limitations of poetry and the plastic arts. Many of his conclusions have been corrected and extended by later criticism; but he indicated more decisively than any of his predecessors the fruitful principle that each art is subject to definite conditions, and that it can accomplish great results only by limiting itself to its special function. The power of *Minna von Barnhelm* was also immediately recognized. This is, on the whole, the best of Lessing's purely dramatic writings.

In 1767 Lessing settled in Hamburg, where he had been invited to take part in the institution of a national theater. The scheme promised well, and, as he associated himself with Bode, a literary man whom he respected, in starting a printing establishment, he hoped that he might at last look forward to a peaceful and prosperous career. The theater, however, being mismanaged, was soon closed, while the printing establishment failed, and left behind it a heavy burden of debt. Many of Lessing's letters from Hamburg breathe almost a spirit of despair, and toward the end of his residence there he determined to quit Germany, believing that in Italy he might find congenial labor that would suffice for his wants.

Instead of going to Italy as he intended, Lessing accepted, in 1770, the office of librarian at Wolfenbüttel, a post which was offered to him by the hereditary prince of Brunswick. In this position he passed his remaining years.

Soon after settling in Wolfenbüttel he found in the library an ancient manuscript, which proved to be a treatise of Berengarius of Tours on transubstantiation in reply to Lanfranc. Lessing was thus induced to write an essay on Berengarius, vindicating his character as a serious and consistent thinker. The essay was much admired by the leading theologians of Germany, and it is, on the whole, the ablest and most interesting of his *Rettungen*. In 1772 lovers of the drama were delighted by the appearance of *Emilia Galotti*, a tragedy which he had begun many years before in Leipsic. Having completed *Emilia Galotti*, Lessing occupied himself for some years almost exclusively with the treasures of the Wolfenbüttel library. The results of his researches (some of them of high value) he embodied in a series of volumes, *Zur Geschichte und Literatur*, the first being issued in 1773, the last in the year of his death.

The concluding period of Lessing's life was devoted chiefly to theological controversy. In *Nathan der Weise*, written in the winter of 1778–79, he gave poetic form to the ideas which he had already developed in prose. As a play it has serious imperfections, but as a dramatic poem it is one of the finest creations of the eighteenth century. In 1780 appeared *Die Erziehung des Menschengeschlechts*, the first half of which he had published in 1777 with one of the "Fragments." Another work of Lessing's last years, *Ernst und Falk* (a series of five dialogues, of which the first three were published in 1777, the last two in 1780), also indicated in a fascinating style many new points of view. Its nominal subject is freemasonry, but its real aim is to plead for a humane and charitable spirit in opposition to a narrow patriotism, an extravagant respect for rank, and exclusive devotion to any particular church.

Lessing's theological opinions exposed him to much petty persecution, and he was in almost constant straits for money. Nothing, however, broke his manly and generous spirit. To the end he was always ready to help those who appealed to him for aid, and he devoted himself with growing ardor to the search for truth. He formed many new plans of work, but in the course of 1780 it became evident to his friends that he would not be able much longer to continue his labors. His health had been undermined by excessive work and anxiety, and after a short illness he died at Brunswick on January 22, 1781.

L'ESTRANGE, Sir Roger (1616–1704), an indefatigable pamphleteer on the royalist and court side during the Restoration epoch, but principally remarkable as the first English man of letters of any distinction who made journalism a profession, was born at Hunstanton in Norfolk, England.

LESUEUR, Jean François (1763-1837), a French composer, was born near Abbeville, France.

LETHE (oblivion) is sometimes used as the name of a river in the infernal regions. It seems to have been an idea current in the religion of the mysteries that there were in the lower world two streams, one of memory and one of oblivion. The initiated were taught to distinguish between them, and directions for this purpose written on a gold plate have been found in a tomb at Petilia, buried doubtless with some initiated person.

LETRONNE, Jean Antoine (1787–1848), French archæologist, was born at Paris.

LETTRES DE CACHET are really *lettres closes*, that is, letters sealed in such a way that they cannot be opened without breaking the seal, and which were originally always addressed to individuals in contradistinction to *lettres patentes*, or letters patent, beginning "know all men by these presents." *Lettres closes* interfering with the administration of justice or the liberty of the subject were forbidden by numerous edicts in the fourteenth, fifteenth, and sixteenth centuries, and the term *lettres de cachet*, as synonymous with lettres closes, is first found in the ordinance of Orleans in 1560. The convenience of such a means to consign one's enemies to prison was seen by Richelieu and Mazarin, who followed the Guise Government in using them frequently, despite numerous protestations on the part of the parlements, of which the most notable was when, in 1648, an ordinance was registered that no man should be kept in prison three days without interrogation. When once Louis XIV. had begun to rule, he made frequent use of *lettres de cachet* both for state purposes and to control and disorganize his nobility, and he boldly justified their use in an edict of 1705. But the most marked justification is to be found in the circular letter addressed to the *parlements* of France in reply to protests against arbitrary imprisonment in 1759, in which the king says that "he reserves arbitrary orders—in other words, *lettres de cachet*—for occasions wherein they may be necessary for the public good and the interests of families." It was the custom for the king to sign a number of blank *lettres de cachet* which his ministers gave away to whomever they pleased. Thus they often fell into hands of people who used them to gratify private hate; fathers obtained them and inserted the names of their sons, wives inserted the names of their husbands, opera dancers those of lovers who had spurned them. The evil grew to such a height that Turgot and Lamoignon de Malesherbes refused to enter the ministry of Louis XVI. unless they might see the contents of the orders they countersigned, and know the causes for which men were to be imprisoned. It is needless to say that when the cahiers of the primary assemblies were prepared, to instruct the deputies to the states-general in the wishes of their constituents, abolition of *lettres de cachet* was demanded in almost all the cahiers of the noblesse and *tiers état*. The subject was mentioned in the early debates of the Constituent Assembly, but lettres de cachet were not formally abolished till January 15, 1790, and on March 13th of the same year all imprisoned under them were ordered to be set at liberty.

LETTS. See Lithuanians.

LEUCADIA. See Santa Maura.

LEUCIPPUS, the founder of Atomism in Greek philosophy, flourished about the middle or latter half of the fifth century B.C. Almost nothing is known of his life. His birthplace is variously given as Elea, Abdera, or Miletus. It is disputed whether he left any writings. Empedocles of Agrigentum and Anaxagoras of Clazomenæ were his contemporaries, while Zeno the Eleatic is said to have been his teacher.

LEUK, or LOÈCHE LA VILLE, a village of Switzerland, at the head of a district in the canton of Valais, fifteen miles by rail east of Sion, on the right bank of the Rhone.

LEUTSCHAU, capital of the Cis-Tisian county of Szepes, Hungary, and until 1876 a royal free town, lies in an elevated position surrounded by mountains, and near the railway from Kassa (Kaschau) to Oderburg, about 120 miles northeast from Budapest. Population, 7,000.

LEVEN, ALEXANDER LESLIE, EARL OF, one of the most distinguished soldiers of his time, was born about the close of the sixteenth century, He was descended from a younger son of the ancient Scottish family of Balquhain. His father was George Leslie of Balgonie, commander of the castle of Blair, and his mother was Anne, daughter of Stewart of Ballechin. At his first outset in life he acted as a volunteer in Lord Vere's regiment in Holland, fighting with the Dutch against the encroachments of Spain, where he rose to the rank of captain. He then entered the service of Gustavus Adolphus of Sweden, and became field-marshal. In 1628, when the town of Stralsund was besieged by Wallenstein, and reduced almost to the last extremity, the king of Sweden sent Leslie to take the command of the garrison, and he acted with such resolution that he obliged the count to raise the siege. For this service medals were struck in his honor. In 1630 he drove the imperialists out of the island of Rügen, and continued to serve with great distinction in the Swedish armies till the troubles in Scotland brought him home. In 1639 he was invited by the Covenanters to take the command of their army. One of his first exploits was to take the castle of Edinburgh by surprise, without the loss of a man. He commanded the Scottish army at Dunse Law in May of that year, and in 1640 he invaded England, and defeated a party of the king's troops at Newburn, which gave him possession of Newcastle and other towns. At the treaty with the king at Ripon, Leslie was one of the commissioners of the parliament, and Charles was so well pleased with his behavior that he created him Lord Balgonie and Earl of Leven, by patent dated 1641.

After suppressing an insurrection in Ireland in 1642, he was in 1643 appointed to the command of the Scottish army sent to assist the parliamentary party against King Charles, but after the execution of that prince he warmly espoused the cause of his son, and served as a volunteer against Cromwell at the unfortunate battle of Dunbar in 1650. Next year, however, a gathering at Alyth of Angus royalists, of whom Leslie was one, was surprised and captured by the troops of General Monk, who was then besieging Dundee. The earl with some others was sent to London and confined in the Tower, where he remained incarcerated for some time, till by the intercession of the queen of Sweden he obtained his liberty. After visiting the queen, and thanking her in person for this service, he retired to his seat at Balgonie in Fifeshire and died there at an advanced age in 1661.

LEVER, CHARLES, novelist, was born at Dublin on August 31, 1806, and died at Trieste on June 1, 1872. His father was an architect, and he entered Trinity College, Dublin, in 1822, taking his degree in 1827. Many of the adventures of college life recorded in *Charles O'Malley* are believed to have actually happened. Later, Lever studied at Göttingen, and obtained a degree there. At some time or other before 1832 he is said to have visited America, and to have sojourned with the Indians, adopting their dress and mode of life, and going through adventures afterward utilized in *Con Cregan* and *Arthur O'Leary*. But it is impossible to be certain as to this period; it is only toward the cholera outbreak of 1832 that something like a firm ground offers itself to the biographer. Lever had taken up the profession of medicine, and he was appointed, first to a district of which the headquarters was Kilrush in Galway, where *Harry Lorrequer* was begun, local stories being largely embodied in it, and then to a district in Ulster, around Coleraine and Newton Limavady, where material was gathered for *Charles O'Malley* and the *Knight of Gwynne*. He married Miss Kate Baker, but even here the mist of uncertainty which envelops him exists, and it is not clear what the real date of the marriage was. After his cholera work was done he proceeded to Brussels. It has been usual to represent him as physician to the embassy, and even Thackeray (who knew him well) has given currency to the description by a quotation in the *Book of Snobs*. But it is certain that Lever was never formally appointed physician to the embassy, though he had letters of introduction to the secretary of the English legation there, and unquestionably practiced. *Harry Lorrequer* was completed at Brussels, and it began to be published in 1837. It was followed by *Charles O'Malley* and *Jack Hinton*. All these stories, but especially the first two, were made up in a great extent of experiences through which Lever had gone, or stories which he had heard in Ireland, and of the reminiscences and oddities of English residents at Brussels, where there were then many retired English officers who had gone through the Peninsular and other campaigns of the great war After a time proposals were made to him to undertake the editorship of the *Dublin University Magazine*, which he accepted, and held the post from 1842 to 1845. During this time his income was considerable. He lived not in Dublin but a little way out of it, and exercised boundless hospitality to visitors. Besides this, he was an inveterate card-player, and not on the whole a lucky one, and he was very fond of horses, which he kept in large numbers for himself and all his family. He was indefatigable in novel writing, *Tom Burke*, *The O'Donoghue*, *The Knight of Gwynne*, etc., following those already named. But the work of editing was irksome to him, and for the reasons just named residence in Ireland made it comparatively unprofitable. He therefore resigned his editorship in the year 1845, and went abroad, where he was always more at home than in England or even in Ireland. At first he lived at Carlsruhe, where G. P. R. James was also residing; then he pitched his tent in a castle of Tyrol, which is said to be pretty accurately described in *A Day's Ride*. Afterward he wandered about, finally settling at Florence. This neighborhood became specially agreeable to him, uniting as it did abundant society with the possibility of enjoying it without great expense. In November, 1858, he received from Lord Derby one of the rare pieces of patronage which have fallen in modern days to the share of Englishmen of letters, by being appointed consul at Spezzia. During this period of wandering or settled life on the Continent, he changed his style of novel writing. His method was always one rather of observation and reproduction than of deliberate creation, and as he had formerly drawn on the humors of Irish life, or the oddities of Wellington's veterans, so now he dealt with those of traveling Britons abroad, and with similar subjects. *The Daltons*, *The Dodd Family Abroad*, *Davenport Dunn*, etc., belong to this time and family for the most part, though some of them rather fall under the earlier class in style and date of composition. *One of Them*, *Barrington*, *The Fortunes of Glencore*, etc., led up to the most singular of all Lever's books, *A Day's Ride, a Life's Romance.* This book, which was published in *All the Year Round*, was said at the time—with what truth it is not easy to say

—to have positively lowered the sale of that publication, yet it contains some of Lever's best work, and displays an originality not common with him. The mixture of burlesque and sentiment was, it may be supposed, either uncongenial or incomprehensible to the ordinary reader.

As he grew older, Lever, whose politics had been a rather indefinite Toryism, became more of a party man, and showed this in the papers published in *Blackwood's Magazine*, under the name of "Cornelius O'Dowd," papers of a miscellaneous kind, but often political. He is said to have thought of engaging, or to have been invited to engage, in regular journalism, but wisely declined. In 1867 he was transferred from Spezzia to Trieste, a change pecuniarily advantageous, but involving the loss of the society which he passionately loved. The last years of Lever's life were somewhat clouded. His health had never been good, and he had not lived carefully. His wife, to whom he was much attached, died before him. But he was still active with his pen, and the novels of his last period, if less lively than his earlier ones, are far better written as well as far more regular and careful in construction. Such are *Sir Brooke Fosbrooke*, *That Boy of Norcott's*, *Sir Jasper Carew*, *The Bramleighs of Bishop's Folly*, and his last book, *Lord Kilgobbin*. He died in the summer of 1872. Novels not yet mentioned are *Roland Cashel*, *Luttrell of Arran*, *Tony Butler*, *Maurice Tiernay*, *The Martins of Cro' Martin*, *St. Patrick's Eve*, etc.

LEVERRIER, Urbain Jean Joseph, one of the greatest astronomers of modern times, was born at St. Lô in Normandy, March 11, 1811. His father, who held a small post under government, made great efforts to send him to Paris, where a brilliant examination gained him, in 1831, admittance to the École Polytechnique. He addressed himself especially to chemical researches under the guidance of Gay-Lussac, and gave striking proof of ability in two papers on the combinations of phosphorus with hydrogen and oxygen, published in *Annales de Chimie et de Physique* (1835 and 1837). His astronomical vocation, like that of Kepler, came from without. The place of teacher of that science at the École Polytechnique falling vacant in 1837, it was offered to and accepted by Leverrier, who, "docile to circumstance," instantly abandoned chemistry, and directed the whole of his powers to celestial mechanics. The first fruits of his arduous labors were contained in two memoirs presented to the Academy, September 16 and October 14, 1839. Pursuing the investigations of Laplace, he demonstrated with greater rigor the stability of the solar system, and calculated the limits within which the eccentricities and inclinations of the planetary orbits vary. This remarkable debut excited much attention, and, on the recommendation of Arago, he took in hand the theory of Mercury, producing, in 1843, tables of that planet far superior in accuracy to those hitherto available. The perturbations of the comets discovered, the one by Faye in November, 1843, the other by De Vico a year later, were minutely investigated by Leverrier, with the result of disproving the identity of the first with Lexell's lost comet of 1770, and of the other with Tycho's of 1585. On the other hand, he made it appear all but certain that Vico's comet was the same with one seen by Lahire in 1678. He was once more, by the summons of Arago, recalled to planetary studies, and this time it was to Uranus that his attention was directed. Step by step, with sagacious and patient accuracy, he advanced to the great discovery which has immortalized his name. Carefully sifting all the known causes of disturbance, he showed that one hitherto unknown must be added to their number, and on September 23, 1846, the planet Neptune was discerned by Galle at Berlin, within one degree of the spot indicated by Leverrier.

This memorable achievement was greeted with an outburst of public enthusiasm, and requited with a shower of public distinctions. Academies vied with each other in enrolling Leverrier among their members; the Royal Society awarded him the Copley medal; the king of Denmark sent him the order of the Dannebrog; he was named officer in the Legion of Honor, and preceptor to the Comte de Paris; a chair of astronomy was created for his benefit at the Faculty of Sciences; he was appointed adjunct astronomer to the Bureau of Longitudes. Returned to the Legislative Assembly in 1849 by his native department of Manche, he voted with the anti-republican party, but devoted his principal attention to subjects connected with science and education. After the *coup d'état* he became a senator and inspector-general of superior instruction, sat upon the commission for the reform of the École Polytechnique (1854), and on January 30, 1854, succeeded Arago as director of the Paris observatory. His official work in the latter capacity would alone have strained the energies of an ordinary man. The institution had fallen into a state of lamentable inefficiency. Leverrier placed it on a totally new footing, freed it from the control of the Bureau of Longitudes, and raised it to its due rank among the observatories of Europe. He did not, however, escape the common lot of reformers. His uncompromising measures and unconciliatory manner of enforcing them raised a storm only appeased by his removal, February 5, 1870. Three years later, on the death of his successor Delaunay, he was reinstated by M. Thiers, but with authority restricted by the supervision of a council. In the midst of these disquietudes he executed with unflinching resolution a task the gigantic proportions of which cannot be contemplated without amazement. This was nothing less than the complete revision of the planetary theories, together with a laborious comparison of results with the most authentic observations, and the construction of tables representing the movements thus corrected. It required all his indomitable perseverance to carry through to the end a purpose which failing health continually menaced with frustration. He had, however, the happiness of living long enough to perfect his work. Three weeks after he had affixed his signature to the printed sheets of the theory of Neptune he died at Paris, in his sixty-seventh year, September 23, 1877.

LEVIS, formerly Pointe Levi or Point Levis, the chief town of a county of the same name in Canada, on the other side of the St. Lawrence from Quebec, with which it communicates by a ferry. Population, 7,800.

LEVITES, or sons of Levi, are defined according to the usual methods of Hebrew genealogical history as the descendants of Levi, the third son of Jacob by Leah. But in Hebrew genealogies we are not necessarily entitled to look upon the eponymus of a tribe as more than ideal personality, and, without entering into the large question how far the patriarchal history may be held to furnish exceptions to this rule, it may be observed that the only narrative in which, on a literal interpretation, Levi appears as a person, bears internal evidence of the intention of the author to delineate under the form of personification events in the history of the tribes of Levi and Simeon which must have taken place after the sojourn of Israel in Egypt. The same events are alluded to in Gen. xlix. 5–7, where Simeon and Levi are plainly spoken of as communities with a communal assembly. They were allied tribes or brothers; their onslaught on the Shechemites was condemned by the rest of Israel; it took place before the

Hebrews had passed from pastoral to settled life; and its results were disastrous to the actors, when their cause was disavowed by their brethren. The Bnê Hamor regained possession of Shechem, as we know from Judges ix., and both the assailing tribes were scattered through Israel, and failed to secure an independent territorial position. The details of this curious portion of the earliest Hebrew history must remain obscure; the narrative in Gen. xxxiv. does not really place them in so clear a light as the briefer reference in Gen. xlix.; for the former chapter has been recast and largely added to by a late writer, who looks upon the action of the brethren in the light of the priestly legislation, and judges it much more favorably than is done in Gen. xlix. In post-canonical Judaism the favorable view of the zeal of Levi and Simeon becomes still more dominant, and the curse of Jacob on the ferocity of his sons is quite forgotten. In the oldest history, however, the treachery of Levi and Simeon toward a community which had received the right of *connubium* with Israel is represented as a crime, which imperiled the position of the Hebrews and was fatal to the future of the tribes directly involved.

But while the Levites were scattered throughout Israel, their name does not disappear from the roll of the tribes. In the blessing of Moses, where Simeon is passed over, Levi still appears, not as a territorial tribe, but as the collective name for the priesthood. The priesthood meant is that of the northern kingdom under the dynasty of Jehu, to which the chapter in question belongs; and, in fact, we know that the priests of the important sanctuary of Dan traced their origin to a Levite, Jonathan, the son of Gershom, the son of Moses. That the Judæan priesthood were also known as Levites in the later times of the kingdom, also appears from the book of Deuteronomy. Alike in Judah and in the north, the priestly prerogative of Levi was traced back to the days of Moses; but in later times, at least, the Judæan priesthood did not acknowledge the Levitical status of their northern colleagues. It must, however, be observed that the prophets Amos and Hosea never speak of the northern priesthood as illegitimate, and Hosea iv. certainly implies the opposite. Presumably it was only after the fall of Samaria, and the introduction of large foreign elements into the population of the north, that the southern priests began to disavow the ministers of the sanctuary of Samaria, most of whom can no longer have been representatives of the old priesthood as it existed before the northern captivity.

In the most developed form of the hierarchical system the ministers of the sanctuary are divided into two grades. All are regarded as Levites by descent, but the mass of the Levites are mere subordinate ministers, not entitled to approach the altar or perform any strictly priestly function; and the true priesthood is confined to the descendants of Aaron. After the exile this principle was actually carried out; priests and Levites are distinguished in the list of the Jews who returned under the decree of Cyrus (Ezra ii.; Neh. vii.); but the former, that is, the descendants of the pre-exilic priests of the royal temple, greatly outnumber the Levites or descendants of the priests of the high places.

The new hierarchical system found its legal basis in the Pentateuch, or rather in the so-called priestly legislation, first publicly accepted as an integral part of the Torah under Ezra and Nehemiah. Here the exclusion of the Levites from all share in the proper priesthood of the sons of Aaron is precisely formulated, their service is regulated from the point of view that they are essentially the servants and hereditary serfs of the priests, while, on the other hand, they are recognized as possessing a higher grade of holiness than the mass of the people, and are endowed with the tithes, of which in turn they pay a tithe to the priests. These regulations as to tithes were enforced by Nehemiah; but the subordinate position of the Levites was hardly consistent with their permanent enjoyment of the revenues of such importance, and we learn from the Talmud that they were finally transferred to the priests. Another provision of the law, viz., the assignation to the Levites of certain cities with a definite measure of inalienable pasture ground (Num. xxxv.; Lev. xxv. 34), was apparently never put in force after the exile.

LEVITICUS. See PENTATEUCH.

LEW-CHEW ISLANDS. The Lew-chew, Loochoo, Liu Kiu, or Riu Kiu Islands include, in the wider application of the name, the whole series extending in a northeast and southwest direction from the southern end of Kiushiu in Japan proper to the northeast of Formosa.

The area of the Lew-chews proper is 1,423 square miles, that of the whole chain 1,864 square miles. The largest islands are Okinawa (often called Great Lew-chew) and Oshima, the former being also the political center of the whole archipelago. The Lew-chews consist in the main of crystalline rocks—gneiss, hornblende, and granite—upheaved at a very remote date, and only partially covered by severely weathered sedimentary strata seldom left in their original horizontal position Coralline limestone is found in great abundance even on the tops of the hills, and the coasts are often fringed by coral reefs. In Okinawa a soft argillaceous rock occupies a large part of the surface. Of the many streams a few attain considerable dimensions, and serve to carry the timber from the highlands; and all around the coasts are excellent harbors. The mildness and humidity of climate, which is the natural consequence of the geographical position of the archipelago, is further enhanced by the neighborhood of the Kuro-Siwo or Pacific gulf-stream. Snow never falls on the tops even of the highest hills; but at the same time even in summer the heat is seldom extreme. Three days seldom pass without rain; sudden downpours are not infrequent, and wet weather often lasts for several days together. Sago-trees and other *Cycadaceæ*, banyans, and pine-trees (resembling the cedar of Lebanon) are abundant, and the natives, who succeed well both as farmers and as gardeners, grow wheat, rice, bananas, tarro (*Colocasia*), sweet potatoes, maize, millet, sugar-cane, egg-plants, etc. There is a small but excellent breed of cattle (usually black); and ponies, pigs, goats, and poultry are kept.

Part of the population of the northern Lew-chews is evidently Japanese, but the aboriginal and preponderating element is of quite another type, in some points similar to the Ainos. The striking features are a comparatively narrow face ending in a pointed chin, large European-looking eyes, thin lips, thin and rather convex nose, strongly developed beard, and a luxuriant growth of hair over breast, arms, and legs. Though closely allied to Japanese, the native language is a genuinely independent form, containing obsolete words only found in the ancient monuments of Japanese literature, and showing the greatest resemblance to the Satsuma dialect. The population of Okinawa was estimated by the American expedition at from 150,000 to 200,000. Doederlein was informed by the officials that Amami Oshima contained 50,000 souls, but thinks 30,000 a more probable conjecture. Besides Napa or Napa-Kiang the capital, and Shui the royal residence, there are some thirty-six towns in Okinawa, with about 6,000 inhabitants each; in the other island Nase the chief town (comprising Itsubemura and Kanekumura) has not more than 2,000, and only five or six of the other villages exceed 500.

LEWES, a market-town and parliamentary borough, and the county town of Sussex, England, is situated on the river Ouse, at the junction of a number of railway lines, fifty miles south of London, and seven north of Newhaven, which is its port. Population, 12,000.

LEWES, George Henry, a prolific and versatile writer, born in London in 1817, was a grandson of Charles Lee Lewes, a comedian who had a considerable reputation in his day. He was educated in London, Jersey, and Brittany, and began active life by attempting business and afterward medicine. Later he appears to have had serious thoughts of making the stage his profession. He finally fixed his choice on a literary career. His early writings belong mainly to the lighter departments of letters. He contributed a large number of critical studies to the leading quarterly and other reviews. These discuss a wide variety of subjects and, though often characterized by hasty impulse and imperfect study, betray a singularly acute critical judgment, which has been enlightened by philosophic study. Of these critical writings the most valuable are those on the drama, which were afterward republished under the title *Actors and Acting* (1875). With this may be taken the volume on *The Spanish Drama* (1846). The combination of wide scholarship, philosophic culture, and practical acquaintance with the theater gives these essays a high place among the best efforts in English dramatic criticism. In 1845-46 he published *The Biographical History of Philosophy*, an attempt to depict the life of philosophers as an ever-renewed, fruitless labor to attain the unattainable. In 1847-48 he made two attempts in the field of fiction—*Ranthrope*, and *Rose, Blanche, and Violet*—which, though displaying considerable skill both in plot and construction, and in characterization, have taken no permanent place in literature. The same is to be said of an ingenious attempt to rehabilitate Robespierre (1849). The culmination of the author's work in prose literature is the *Life of Goethe* (1855), probably the best known of his writings. From about 1853 Lewes' writings show that he was occupying himself with scientific and more particularly biological work. He may be said to have always manifested a distinctly scientific bent in his writings, and his closer devotion to science was but the following out of early impulses. The most important of his essays are collected in the volumes *Seaside Studies* (1858), *Physiology of Common Life* (1859), *Studies in Animal Life* (1862), and *Aristotle, a Chapter from the History of Science* (1864). In 1865, on the starting of the *Fortnightly Review*, Lewes became its editor, but he retained the post for less than two years. This date marks the transition from more strictly scientific to philosophic work. He had from early youth cherished a strong liking for philosophic studies; one of his earliest essays was an appreciative account of Hegel's *Æsthetics*. Coming under the influence of positivism as unfolded both in Comte's own works and in J. S. Mill's *System of Logic*, he abandoned all faith in the possibility of metaphysic, and recorded this abandonment in the above-mentioned *History of Philosophy*. Yet he did not at any time give an unqualified adhesion to Comte's teaching, and with wider reading and reflection his mind moved away further from the positivist's standpoint. In the preface to the third edition of his *History of Philosophy* he avowed a change in this direction, and this movement is still more plainly discernible in subsequent editions of the work. The final outcome of this intellectual progress is given to us in *The Problems of Life and Mind*, which may be regarded as the crowning work of his life. His sudden death in 1878 cut short the work, yet it is complete enough to allow us to judge of the author's matured conceptions on biological, psychological, and metaphysical problems.

Mr. Lewes' connection with Marian Evans (George Eliot) doubtless had much influence on the lives and writings of both.

LEWIS and HARRIS form together an island of the Outer Hebrides, nearly separated into two parts by the inlets of Loch Reasort and Seaforth—the northern part, Lewis or the Lews, being in Ross-shire, and the southern part, Harris, in Inverness. The island is situated about thirty miles from the mainland; its length is sixty miles, the average breadth fifteen, and the extreme breadth thirty. The area is 770 square miles, of which 575 are comprised in Lewis. The climate is very moist and unsuitable for tillage.

LEWIS, Sir George Cornewall, Bart., statesman and man of letters, was born in London, April 21, 1806. His father, Thomas F. Lewis, of Harpton Court, Radnorshire, after holding subordinate office in various administrations, became a poor-law commissioner. He was made a baronet in 1846. Lewis was educated at Eton, and at Christ Church, Oxford. He then entered the Middle Temple, and was called to the bar in 1831. In the year before he had, with John Romilly and John Stuart Mill, attended the celebrated lectures on jurisprudence delivered by John Austin at London University. In 1832 he undertook his first public work as one of the commissioners to inquire into the condition of the poor Irish residents in the United Kingdom. Again, in 1834, Lord Althorp included him in the commission to inquire into the state of church property and church affairs generally in Ireland. To this fact we owe his work on *Local Disturbances in Ireland, and the Irish Church Question*, in which he condemned the existing connection between church and state, proposed a state provision for the Catholic clergy, and maintained the necessity of an efficient workhouse organization. During this period of apprenticeship to politics Lewis' mind was much occupied with the phenomena of language. Before leaving college he had published some observations on Whately's doctrine of the predicables, and soon afterward he assisted Thirlwall and Hare in starting the *Philological Museum*. Its successor, the *Classical Museum*, he also supported by occasional contributions. In 1835 he published an *Essay on the Origin and Formation of the Romance Languages*. The *Remarks on the Use and Abuse of Some Political Terms* (London, 1832) may have been suggested by Bentham's *Book of Parliamentary Fallacies*, but it shows all that power of clear, sober, original thinking which marks his larger and later political works. And yet this original mind did more than most scholars in the humbler walk of useful translation. He translated Boeckh's *Public Economy of Athens* and Müller's *History of Greek Literature*, and he assisted Tufnell in the translation of Müller's *Dorians*. Some time afterward he edited a text of the *Fables* of Babrius. While his friend Hayward conducted the *Law Magazine*, he wrote in it frequently on such subjects as secondary punishments and the penitentiary system. In 1836, at the request of Lord Glenelg, he accompanied John Austin to Malta, where they spent nearly two years reporting on the condition of the island and framing a new code of laws. One leading object of both commissioners was to associate the Maltese in the responsible government of the dependency. On his return to England Lewis succeeded his father as one of the principal poor-law commissioners. But his literary activity did not cease. In 1841 appeared the *Essay on the Government of Dependencies*, a systematic statement and discussion of the various relations in which colonies may stand toward the mother country. In

1844 Lewis married Lady Maria Theresa Lister, sister of Lord Clarendon, and a lady of literary tastes. Much of their married life was spent in Kent House, Knightsbridge. They had no children. In 1847 Lewis resigned his office. He was then returned for the county of Hereford, and Lord John Russell appointed him secretary to the Board of Control, but a few months afterward he became under secretary to the Home Office.

In 1850 he succeeded Hayter as financial secretary to the Treasury. About this time, also, appeared his *Essay on the Influence of Authority in Matters of Opinion.* On the dissolution of parliament which followed the resignation of Lord John Russell's ministry in 1852, Lewis was defeated for Herefordshire and then for Peterborough. Excluded from parliament he accepted the editorship of the *Edinburgh Review*, which the death of Empson had left vacant. Lord Halifax offered him, in 1853, the governorship of Bombay, but he remained editor until 1855. In 1855 Lewis succeeded his father in the baronetcy. He was at once elected member for the Radnor boroughs, and Lord Palmerston made him chancellor of the exchequer. The position was difficult, for he had a war loan to contract and heavy additional taxation to impose. But his industry, method, and clear vision carried him safely through. After the change of ministry in 1859 Sir George became home secretary under Lord Palmerston, and in 1861, much against his wish, he succeeded Sidney Herbert (Lord Herbert of Lea) at the War Office. The closing years of his life were marked by increasing intellectual vigor. In 1859 he published an able *Essay on Foreign Jurisdiction and the Extradition of Criminals*, a subject to which the attempt on Napoleon's life, the discussions on the Conspiracy Bill, and the trial of Bernard had drawn general attention. His two latest works were the *Survey of the Astronomy of the Ancients*, in which, without professing any knowledge of Oriental languages, he applies a skeptical analysis to the ambitious Egyptology of Bunsen; and the *Dialogue on the Best Form of Government*, in which, under the name of Crito, the author points out to the supporters of the various systems that there is no one abstract government which is the best possible for all times and places. Sir George died in April, 1863.

LEWIS, MATTHEW GREGORY, often referred to as "Monk" Lewis, was born in London on July 9, 1775. He was educated for a diplomatic career at Westminster School and at Christ Church, Oxford, spending most of his vacations abroad in the study of modern languages; and in 1794 he proceeded to the Hague as attaché to the British embassy. His stay there lasted only a few months, but was marked by the composition, in ten weeks, of *Ambrozio, or the Monk*, which was published in the summer of the following year. It immediately achieved extensive celebrity; but some passages it contained were of such a nature that about a year after its appearance an injunction to restrain its sale was moved for and a rule *nisi* obtained. Whatever its demerits, ethical or æsthetic, may have been, *The Monk* did not interfere with the reception of Lewis into the best English society; he was favorably noticed at court, and almost as soon as he came of age he obtained a seat in the House of Commons as member for Hindon, Wilts. After some years, however, during which he never ventured to address the House, he finally withdrew from a parliamentary career. His tastes lay wholly in the direction of literature, and *The Castle Specter* (1796, a musical drama of no great literary merit, but which enjoyed a long popularity on the stage), *The Minister* (a translation from Schiller's *Kabale u. Liebe*), *Rolla* (1797, a translation from Kotzebue), with numerous other operatic and tragic pieces, appeared in rapid succession. *The Bravo of Venice*, a romance translated from the German, was published in 1804, and has since been reprinted; next to *The Monk* it is the work connected with the name of Lewis which has been most extensively read. By the death of his father he succeeded to a large fortune, and in 1815 embarked for the West Indies to visit his estates; in the course of this tour, which lasted four months, the *Journal of a West Indian Proprietor*, published posthumously in 1834, was written. A second visit to Jamaica was undertaken in 1817, in order that he might become further acquainted with, and able to ameliorate, the condition of the slave population; but the fatigues to which he exposed himself in the tropical climate brought on a fever which terminated fatally on the homeward voyage, May 14, 1818.

LEWIS, MERIWETHER, American explorer, was born near Charlottesville, Va., August 18, 1774. In 1794 he volunteered with the troops called out to suppress the "whisky insurrection," was commissioned as ensign in the regular army in 1795, and as captain in 1800, and was President Jefferson's private secretary from 1801 to 1803. On Jefferson's recommendation he was appointed by Congress to conduct, in connection with Capt. William Clarke, an expedition to the headwaters of the Missouri river, and thence across the mountains to the Pacific Ocean—the first extended exploration of the northwestern portion of the United States. The United States had as yet acquired no claim to this region, and the exploration was designed by Jefferson in the interests not only of geographical science but of territorial acquisition. Lewis and Clarke, setting out late in 1803 with twenty-eight men, spent the winter at the mouth of the Missouri. Early in the spring the party embarked in several boats, and during the summer made the difficult ascent of the Missouri as far as 47° 21′ N. latitude, where the second winter was passed among the Mandan Indians. In 1805 the ascent of the Missouri was continued as far as the tributary which they named Jefferson river, which was followed to its source in the southwestern part of what is now the State of Montana. Procuring a guide and horses from the Shoshone Indians, they pushed westward through the mountains, and on October 7th embarked in canoes on a tributary of the Columbia river, the mouth of which they reached on November 15th. They had traveled upward of 4,000 miles from their starting point, had encountered various Indian tribes never before seen by whites, had made scientific collections and observations, and were the first explorers to reach the Pacific by crossing the continent north of Mexico. After spending the winter upon the Columbia, they made the return journey across the mountains and down the Missouri, reaching the Mississippi in September, 1806. The reports of the Lewis and Clarke expedition attracted great attention at the time, and it has scarcely been exceeded in romantic interest by later explorations in any quarter of the globe. The leaders and men of the exploring party were rewarded with liberal grants of land, and Lewis was made governor of the Territory of Missouri. In the unwonted quiet of his new duties his mind, always subject to melancholy, became unbalanced, and, while on his way to Washington, he committed suicide near Nashville, Tenn., October 11, 1809.

LEWISTON, a city of Androscoggin county, Me., is situated thirty-six miles north of Portland, on the left bank of the Androscoggin, and is connected by several bridges with Auburn, the capital of the county. As the river at this point breaks over a ledge of mica schist and gneiss, and the natural fall of forty feet has been raised to fifty feet by a strong granite dam, Lewiston commands an abundant supply of water-power. Cotton and woolen goods (shirtings, sheetings, cassimeres, beavers, tweeds, cloakings), twine, boots and shoes, machinery, etc., are produced to the annual value of $11,000,000—there being nine considerable manufacturing corporations in the city besides the Franklin Company, which owns the entire water-power. The city hall (1872) is a very fine building; and a public library was founded by the corporation in 1861. Bates College was founded by the Free Baptists in 1863–64, and named in honor of Benjamin F. Bates, of Boston.

Lewiston dates from 1770. In 1795 it was incorporated as a town, and in 1861 as a city. The population was 3,584 in 1850, 7,424 in 1860, 13,600 in 1870, and in 1900 was 23,761.

LEXINGTON, capital of Fayette county, Ky., is situated near the center of the State, in the midst of a table-land 1,100 feet above the sea, known as the Blue Grass region. It stands on a small subtributary of the Kentucky river, seventy-nine miles south of Cincinnati, and ninety-four miles east-by-south of Louisville. The population (3,584 in 1850, 7,424 in 1860, and 13,600 in 1874) in 1900, 26,369. Lexington is an important railway junction, has an extensive trade, and manufactures whisky, flour, bagging, ropes, carriages, and machinery. Two railroads, completed in 1882, give access to the mountainous eastern region of the State, from which iron, coal, and timber are obtained in abundance. The surrounding district is characterized at once by beauty and fertility, and the town has been laid out in a spacious and attractive style. It is the seat of the State university (chartered in 1858, originally opened at Harrodsburg in 1859, and removed to Lexington and incorporated with the Transylvania university in 1865), the State agricultural college, and one of the State lunatic asylums (625 patients). Besides the university library, there is a public library of 15,000 volumes. Lexington was founded by Col. Robert Patterson in 1775, and received its name in honor of the first contest in the war of American independence, fought in April of that year at Lexington, Middlesex county, Mass.

LEXINGTON, the capital of Rockbridge county, Va., is situated on the North river, forty miles from Staunton, Va. It is a handsome town, and is the seat of Washington and Lee University, and of the Virginia Military Institute. Population (1900), 3,203.

LEXINGTON, the capital of Lafayette county, Mo., is situated on the Missouri river, forty-two miles east of Kansas City, at the intersection of several lines of railroad. It contains two colleges, two savings and two other banks, ten churches, printing-offices, and furniture and woolen factories, and had in 1900 a pop. of 4,190.

LEXINGTON, although only a post-village of Middlesex county, Mass., with a pop. (1900) of 3,831, is one of the most noted places in American history. Here, on April 19, 1775, occurred the first armed conflict of the Revolution, when the British regulars were defeated by the minutemen. A monument to the eight patriots who fell on that occasion marks the field of battle. (See Concord, *ante.*)

LEYDEN, or Leiden, a city of the Netherlands, in the province of South Holland, about twenty miles southwest of Amsterdam, and six inland from the German Ocean. The Old Rhine, on which it is situated, enters at the eastern side by two arms which unite near the middle of the town so as to divide the western half into two nearly equal portions. Though the boundaries, which now include about 467 acres, have been six times extended, the general shape is wonderfully regular, nor is regularity wanting in the interior arrangement of the quiet, respectable town with its canals and moats, its broad streets, and lifeless squares. The pensive and even melancholy impression which it seems sometimes to produce on the stranger is easily explained. Leyden is *par excellence* an academic city; the bustle of its great markets for cattle and dairy produce is confined to certain spots, and lasts only for so many hours on so many days, and its industrial activity, considerable though it be, is not sufficient to give that appearance of life and movement which their flourishing local and transit trade makes so generally characteristic of the towns of Holland. The university is still a flourishing institution, with fifty professors; but other universities have grown up in the Netherlands, and even professors of European reputation can no longer attract from foreign lands the numbers that visited Leyden in the days of Lipsius, Vossius, Heinsius, Gronovius, Hemsterhuis, Ruhnken, Valckenaer, Scaliger, and Boerhaave. As a class the students are remarkably quiet and orderly. Many are destined to a diplomatic career. The university (*Akademie*) was opened in February, 1575, and originally located in the convent of St. Barbara. In 1581 it was transferred to the convent of the White Nuns, the site of which it still occupies, though the building was destroyed in 1616. Of the institutions connected with the university it is sufficient to mention the library (upward of 160,000 volumes and 4,650 MSS. and 2,400 pamphlet portfolios), rich in Oriental and Greek manuscripts and old Dutch travels; the botanic gardens, with splendid collections of East Indian plants; the observatory (1860); the museum of natural history, one of the principal establishments of its kind in Europe; the museum of antiquities, with a specially valuable Egyptian department; the ethnographical museum, of which the nucleus was Von Siebold's Japanese collections; and the national institution for East Indian languages, ethnography, and geography. Objects of artistic and antiquarian interest are fewer than might be expected from the position which Leyden holds in the history of painting (Rembrandt, Jan Steen, and Gerard Douw were natives of the town); but such as they are—pieces by Van Finck, Fr. van Mieris, Cornelis Engelbrechtszoon, Lucas of Leyden, and other masters—they have for, the most part been collected in the newly founded municipal museum located in the old cloth hall. In 1623 the population of Leyden was much more than 50,000, and in 1640, it is estimated, reached 100,000. Between 1796 and 1811 it sunk to 30,000. In 1850 it was 35,864; in 1870, 38,943 (9,632 Roman Catholics, 396 Jews); and is now about 41,000.

LEYDEN, John, an eminent Scotch linguist, was born September 8, 1775, at Denholm, on the Teviot, not far from Hawick. In 1794, Leyden formed the acquaintance of Dr. Robert Anderson, editor of *The British Poets* and of *The Literary Magazine.* Contributions to his magazine were probably what brought them first together, but more important results followed from their intimacy than either the verses on "Ruberslaw," or "The Descent of Odin," translated from the Norse. For it was Anderson who introduced him to Dr. Alexander Murray, and Murray, probably, who led him to the study of Eastern languages, to which that great scholar was so passionately devoted. Soon they became warm friends and generous rivals, though Leyden excelled, perhaps, in the rapid acquisition of new tongues and acquaintance with their literature, while Murray was the more scientific philologist. Through Anderson also he came to know Richard Heber, by whom he was brought under the notice of Walter Scott, when he was collecting materials for his *Minstrelsy of the Scottish Border.* Leyden was admirably fitted for helping in this kind of work. A borderer himself, an enthusiastic lover of old ballads and folk-lore, he spared no pains to enrich the work that promised to bring fame to his beloved hills and glens. In 1803 he sailed for Madras, and took his place in the general hospital there. From that he was soon promoted to be naturalist to the commissioners about to survey Mysore. Ere long, however, his knowledge of the languages and dialects of India procured him an appointment as professor of Hindustani, which he soon after resigned for a judgeship, and that, again, to be a commissioner in the court of requests, which required a familiarity with several Eastern tongues. In 1811, having joined Lord Minto in the expedition to Java, on landing there he made his way into a library which was said to contain many Eastern MSS., without having the place aired, and was seized with shivering and sickness, first symptoms of the Batavian fever. The climate of India had never agreed with him, and his constitution had already been shaken by several serious illnesses. He died August 28, 1811.

LEYDEN, Lucas van. See Lucas.

LHASA, often written Lassa, for many centuries the chief city of Tibet. Though the place is of great celebrity, the accounts of it are scanty, and information has to be sifted from authorities differing considerably in age. The city stands near the middle of a tolerably level plain, which is surrounded on all sides by hills, and extends about thirteen miles from east to west and about seven miles from north to south. It lies half a mile to the north of a considerable river called the Kichu Tsanpu, or Tsang-chu. The meaning of the name *Lhá-sa* is "God's ground." Formerly it used to be known to the Mongols as *Barontala*, the "right side," or western region; now, according to Huc they call it *Monhe Dhot* or *Dehot*, "Eternal Sanctuary." In eastern Turkestan it seems to be best known as *Jo*, a name which properly refers to the great central temple of which we shall speak.

The city is nearly circular in form, and according to Nain Singh less than a mile in diameter. It was walled in the latter part of the seventeenth century, but the walls were destroyed during the Chinese occupation in 1722. The population has been estimated at 40,000 to 80,000; the last estimate perhaps including the great population of monks and students in the convents near the city. The houses generally are large, and of three stories at least, but the town is very dirty.

Lhasa is not only the nucleus of a cluster of vast monastic establishments, which attract students and aspirants to the (so-called) religious life from all parts of Tibet and Mongolia, and the seat of a quasi-papacy, but is also a great place of pilgrimage, so that the streets and public places swarm with visitors from every part of the Himalayan plateau, and from all the steppes of Asia between Manchuria and the Balkash Lake, who come to adore the living Buddha, to seek the purgation of their sins and the promise of a happy transmigration, and to carry away with them holy relics, blessed rosaries, and all the miscellaneous trumpery which is set forth to catch the money of idle people in Asia and Europe, whether they are pilgrims or frequenters of mineral springs, while as usual a great traffic arises quite apart from the pilgrimage. The city thus swarms with crowds attracted by devotion and the love of gain, and presents an astonishing diversity of language, costume and physiognomy; though in regard to the last point, varieties of the broad face and narrow eye greatly predominate.

L'HÔPITAL, or L'Hospital, Michel de, chancellor of France from 1560 to 1568, was born near Aigueperse in Auvergne (now Puy-de-Dôme) about the year 1505. On the completion of his studies he joined his father at Bologna, and afterward went to Rome in the suite of Charles V. For some time he held the position of auditor of the rota at Rome, but in 1534, encouraged by the fair promises of Cardinal de Grammont, he returned to France. The death of his patron soon afterward seriously impaired his prospects; but after he had entered himself of the Parisian bar, his marriage, in 1537, to a daughter of the lieutenant-criminel procured for him the post of counselor to the parliament of Paris. This office he held until 1547, when he was sent by Henry II. on a mission to Bologna, where the council of Trent was at that time sitting; after sixteen months of wearisome inactivity there, he was by his own desire recalled at the close of 1548. L'Hôpital now for some time held the position of "chancellor" in the household of the princess Margaret, duchess of Beiri, and in 1554 he was made superintendent of the royal finances. In 1559 he accompanied his mistress, now duchess of Savoy, to Nice, where, on the following year, tidings reached him that he had been chosen to succeed Olivier in the chancellorship of France. In accordance with the consistent policy of inclusion and toleration by which the whole of his official life was characterized, he induced the council to call the Assembly of Notables, which met at Fontainebleau in August, 1560, and agreed that the States-General should be summoned, all proceedings against heretics being meanwhile suppressed, pending the reformation of the church by a general or national council. The States-General met in December; the edict of Orleans (July, 1561) followed, and finally, after the colloquy of Poissy, that of January, 1562, the most liberal (except that of Nantes) ever obtained by the Protestants of France. Its terms, however, were not carried out, and during the war which was the inevitable result of the massacre of Vassy in May, L'Hôpital, whose dismissal had been for some time urged by the papal legate Hippolytus of Este, found it necessary to retire to his estate at Vignay near Étampes, whence he did not return until after the pacification of Amboise (March 19, 1563). It was by his advice that Charles IX. was declared of age (August 17, 1563) at Rouen, a measure which really increased the power of Catherine de' Medici; and it was under his influence also that the parliament of Paris in 1564 refused to sanction the publication of the acts of the council of Trent, on account of their inconsistency with the Gallican liberties. In 1564–66 he accompanied the young king on an extended tour through France; and in 1566 he was instrumental in the promulgation of an important edict for reform of abuses in the administration of justice. The renewal of the religious war in September, 1567, however, was at once a symptom and a cause of diminished influence to L'Hôpital, and in February, 1568, he obtained his letters of discharge, which were registered by the parliament on May 11, his titles, honors, and emoluments being reserved to him during the remainder of his life. Henceforward he lived a life of unbroken literary seclusion at Vignay, his only subsequent public appearance being by means of a "mémoire" which he addressed to the king in 1570 under the title *Le but de la guerre et de la paix, ou Discours du chancelier L'Hospital pour exhorter Charles IX. à donner la paix à ses sujets*. Though not exempt from considerable danger, he passed in safety through the troubles of the St. Bartholomew, but did not long survive them. His death took place either at Vignay or at Bélesbat (Courdimanche Étampes) on March 13, 1573.

LIAU-YANG, or Leaou-Yang, a city of China, formerly the chief town of the province of Liau-tung or Shing-king (southern Manchuria), and still a place of considerable mark, thirty-five miles south of Moukden. The population is estimated at 80,000.

LIBANIUS, a Sophist, was the most distinguished Greek writer of the fourth century A.D. He was born at Antioch between 314 and 316. He studied at Athens, and spent most of his earlier manhood in Constantinople and Nicomedia. His private classes at Constantinople were much more popular than those of the public professors; and their jealousy found means of having him expelled from Constantinople in 346 on the charge of studying magic. He was recalled from Nicomedia after five years. Ill health obliged him to retire to Antioch, where he spent the latter part of his life. Though a pagan by religion, he enjoyed the favor of the Christian emperors.

LIBAU, a port of Russia, on the Baltic Sea, in the government of Courland and district of Grobin, 143 miles by rail southwest of Riga. It is situated at the northern extremity of a narrow sandy peninsula which separates Lake Libau (twelve miles long and two miles wide) from the Baltic Sea. The town is also a watering-place, yearly visited by several hundreds of persons. Population, in 1881, 27,900; with military and railway servants, 30,000; in 1898, 64,505.

LIBEL AND SLANDER are the terms employed in English and American law to denote injurious attacks upon a man's reputation or character by words written or spoken, or by equivalent signs. In most early systems of law we find verbal injuries treated as a criminal or quasi-criminal offense, the essence of the injury lying not in pecuniary loss, which may be compensated by damages, but in the personal insult which must be atoned for—a vindictive penalty coming in the place of personal revenge. By the law of the XII. Tables, the composition of scurrilous songs and gross noisy public affronts were punished by death. Minor offenses of the same class seem to have found their place under the general conception of *injuria*, which included ultimately every form of direct personal aggression which involved contumely or insult. In the later Roman jurisprudence, which has, on this point, exercised considerable influence over modern systems of law, we find verbal injuries dealt with in the edict under two heads. The first comprehended defamatory and injurious statements which were made in a public manner. In this case the essence of the offense lay in the unwarrantable public proclamation, in the contumely which was offered to a man before his fellow-citizens. In such a case the truth of the statements was no justification for the unnecessarily public and insulting manner in which they had been made. The second head included defamatory statements which were made in private, and in this case the offense lay in the imputation itself, not in the manner of its publication. The truth was therefore a sufficient defense, for no man had a right to demand legal protection for a false reputation. Even belief in the truth was enough, because it took away the intention which was essential to the notion of *injuria*. The law thus aimed at giving sufficient scope for the discussion of a man's character, while at the same time it protected him from needless insult and pain. The remedy for verbal injuries was long confined to a civil action for a money penalty, which was estimated according to the gravity of the case, and which, although vindictive in its character, doubtless included practically the element of compensation.

The earlier history of the English law of defamation is somewhat obscure. Civil actions for damages seem to have been tolerably frequent so far back as the reign of Edward I. There was no distinction drawn between words written and spoken. When no pecuniary penalty was involved such cases fell within the old jurisdiction of the ecclesiastical courts, which was only finally abolished during the present reign.

The first important distinction we encounter is that between slander and libel, between the oral and written promulgation of defamatory statements. In the former case the remedy is limited. The law will not take notice of any kind of abusive or defamatory language. It must be shown either that the plaintiff has suffered actual damage as a direct consequence of the slander, or that the imputation is of such a nature that we are entitled to infer damage as a necessary consequence. The special damage on which an action is founded for slanderous words must be of the nature of pecuniary loss. Loss of reputation or of position in society, or even illness, however clearly it may be traced to the slander, is insufficient. When we cannot prove special damage, the action for slander is only allowed upon certain strictly defined grounds. These are the imputation of a crime or misdemeanor which is punishable corporeally, *e.g.*, by imprisonment; the imputation of a contagious or infectious disease; statements which tend to the disherison of an apparent heir; and lastly, slanders directed against a man's professional or business character, which tend directly to prejudice him in his trade, profession, or means of livelihood. In the latter case the words must either be directly aimed at a man in his business or official character, or they must be such as necessarily to imply unfitness for his particular office or occupation.

The action for libel is not restricted in the same way as that for slander. Originally, as we have seen, there appears to have been no essential distinction between them, but the establishment of libel as a criminal offense had probably considerable influence, and it soon became settled that written defamatory statements, or pictures and other signs which bore a defamatory meaning, implied greater malice and deliberation, and were generally fraught with greater injury than those which were merely made by word of mouth. The result has been that the action for libel is not limited to special grounds, or by the necessity of proving special damage. It may be founded on any statement which disparages a man's private or professional character, or which tends to hold him up to hatred, contempt, or ridicule. In civil cases the libel must be published by being brought by the defendant under the notice of a third party, and it has been held that it is sufficient if this has been done by gross carelessness, without deliberate intention to publish. Every person is liable to an action who is concerned in the publication of a libel, whether he be the author, printer, or publisher; and the extent and manner of the publication, although not affecting the ground of the action, is a material element in estimating the damages.

It is not necessary that the defamatory character of the words or writing complained of should be apparent on their face. They may be couched in the form of an insinuation, or may derive their sting from a reference to circumstances understood by the persons to whom they are addressed. In such a case the plaintiff must make the injurious sense clear by an averment called an innuendo, and it is for the jury to say whether the words bore the meaning thus ascribed to them.

In all civil actions for slander and libel the falsity of the injurious statements is an essential element, so that the defendant is always entitled to justify his statements by their truth; but when the statements are in themselves defamatory, their falsity is presumed, and the burden of proving their truth is laid upon the defendant.

The American libel law is based upon that prevailing in England, but has been modified by statute in some States. Much dissatisfaction is felt by newspaper publishers and writers of the law as it stands, and legislation to remedy its imperfections has been suggested. In some States it is permitted to plead in defense of an alleged libel that the statement was true and that it was made in the interest of the public.

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